A History of the Passamaquoddy Tidal Power Project

Theodore C. Holmes

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A HISTORY OF THE PASSAMAQUODDY
TIDAL POWER PROJECT

By

THEODORE C. HOLMES

B. A., University of Maine, 1950

A THESIS
Submitted in Partial Fulfillment of the
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The alternate rise and fall of the level of the seas and oceans, the tide, has interested men for centuries. Although utilized to a small extent in past years, chiefly in the form of tide mills, the tides have never been harnessed on a large scale. The idea has been studied in several countries. In the United States, the only large-scale tidal power proposal is the Passamaquoddy project at Eastport, Maine.

The late Dexter P. Cooper, an engineer, is usually given credit for the invention of the Passamaquoddy project. He became interested in the idea in the 1920's, and planned to build an international project involving the United States and Canada. In 1925 he secured a charter of incorporation from the State of Maine. In 1926 Canada granted him permission to build the dams, with limitations. One provision of the Canadian charter was that construction would have to begin within three years from the passage of the Act. When Cooper applied for a renewal of the Canadian charter in 1929, it was refused and he had to abandon the international scheme. Among the reasons for Canadian opposition was the belief that the development would destroy the fisheries and ruin the summer resort business. Cooper then designed a smaller two-pool tidal power project
which could be constructed entirely within the United States. In 1934, his American plan was denounced as economically impracticable by the Federal Power Commission and the Public Works Administration, chiefly because it could not be shown that there was a definite market for the power. Through the persistence of Passamaquoddy's supporters, the project was reconsidered and the construction of a one-basin development was undertaken by Army Engineers in 1935, partly as a relief measure. Work was abandoned in 1936, before the project was completed, because Congress refused to appropriate additional money.

The Federal Power Commission reviewed the project in 1941, and again estimated that the power from such a development would be too expensive and that there was no market for the energy. After the Second World War, a proposal for the original international scheme was revived. Its supporters declare that it would be larger in size and production capacity than any of the designs yet studied or attempted and therefore might be economically feasible. There is little data on the international plan since it has never been studied by a government agency. In 1950, the International Joint Commission estimated that a complete survey to determine the project's practicability would cost about $3,000,000.

Engineers, on the whole, have upheld the engineering feasibility of Passamaquoddy plans. The economics of the project have always been questioned. Unless a survey by experts, a proposal for which is before Congress, shows that electrical energy from an international Passamaquoddy development is both
inexpensive and saleable, it is doubtful if the project will be constructed in the near future.
PREFACE

The Passamaquoddy tidal power project is unique in that it is the only large-scale tidal plan ever seriously considered by the government of the United States. The idea itself—that of indirectly harnessing the energy of the sun and the moon—has fascinated both engineers and laymen. The proposition has been before state and federal governments and agencies since the 1920's. Prominent engineers, leading statesmen, and several American presidents have been among those who have been actively interested. The scheme has been vigorously attacked and defended during the course of its history. From the editorial writer who wrote that the idea was more important than the invention of the steam engine, to others who have condemned the proposal as one of the most outrageous engineering frauds offered to the public in our nation's history, praise and criticism have ranged between two extremes.

The purpose of this thesis has been to present objectively a history of the tidal power plan from its birth as an idea to the present bill for a survey before Congress. Since the proposal has been the subject of controversy since its inception, an attempt has been made to record the chief arguments which, at one time or another, have been used to promote or assail the plan.

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Principal Abbreviations


Hearings Before the Subcommittee of the Committee on Foreign Affairs. House of Representatives, 83rd Congress, 1st Session, 1953.

--- House Foreign Affairs Subcommitte Hearings, 1953.


The Legislative Record of the 82nd Legislature of the State of Maine, 1925.

--- Maine Legislative Record, 1925.


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INTRODUCTION

For centuries men have been interested in the forces which affect the sea. An old tradition relates that the Greek philosopher, Aristotle, threw himself into the Euripus, a narrow strait near the mainland of Greece, because he could not determine the cause of the unsettled flow of water there.1

More than two thousand years ago, the Greeks recorded their observations of the alternate rise and fall of the sea. Herodotus, the historian, noticed the phenomena while traveling through Arabia near the Red Sea; "In this sea there is an ebb and flow of the tide every day."2 Other scattered references appear in history. The Roman naturalist, Pliny, writing in the first century was puzzled by the mystery and irregularity of the tides,3 and a few centuries later the Venerable Bede observed:

Which place, as the tide flows and ebbs twice a day, is enclosed by the waves of the sea like an island; and again, twice in the day, when the shore is left dry, becomes contiguous to the land.4

The ancients offered curious explanations for the cause of the force. Chinese writers believed that the water was the blood of the earth and the tides the beating of its pulse.5 The Greek

geographer, Strabo, thought the cause to be the rising and sinking of the beds of the sea.

Although a Greek, Posidonius, saw a connection between the moon and the movements of the ocean, and Pliny wrote that "the cause lies in the sun and moon," centuries passed before a scientific explanation of the tides was evolved. Finally, in 1687, Sir Isaac Newton formulated his law of gravity. His conclusions revealed that the tides were caused principally by the attraction of the moon and the sun. Other men carried Newton's investigations further in the years that followed.

It is not known exactly when men first realized the possibility of harnessing the energy of the tides for developing mechanical power. For many years several of the following methods had been suggested: (1) using the velocity of the tide to operate paddles on a raft; (2) raising a float by the rising tide and generating power by its descent; and (3) the compression of air by the rising tide. None of these schemes proved to be efficient or practical for developing power on a large scale.

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8 Rackham, op. cit., p. 373.
9 Andrew Motte, (trans.), *Sir Isaac Newton's Mathematical Principles of Natural Philosophy*, Berkeley: University of California Press, 1948, p. 594. Although the moon is of less mass than the sun, it exerts a greater pull because it is nearer the earth.
11 In 1925, Alexander Wilson, a citizen of Bar Harbor, Maine, had a hearing before the State Public Utilities Committee for a plan to generate energy from the tides by compressed air. *Bangor Daily News*, February 13, 1925.
On a small scale, however, the utilization of tidal power had been realized in the form of tide mills, many of which were built in Europe and the United States. The records of a tide mill in England date back to the twelfth century. Some were built in America as early as the seventeenth century. In 1836, the Maine State geologist, Charles T. Jackson, visited a tide mill at Lubec, Maine, and reported that the mill operated by power supplied by submerged water wheels which ran machinery for grinding and cracking gypsum. Other tide mills constructed in Maine included one at East Boothbay for sawing timber, another at Kennebunkport established as a grist mill, and one at Harpswell for grinding corn. A tidewater mill erected at Castine twenty years before the Revolutionary War still survives.

The only practical method of developing tidal energy on a large scale is the basin method. This consists of storing tidal water in one or more pools separated from the sea by dams and using the stored water to create electrical energy by letting it pass through turbines. The basin method and various adaptations of it form the basis of all modern tide power schemes. Although no large tidal power plan using this method has ever been constructed, the idea has been studied seriously in several countries, including

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15Lewiston Evening Journal, June 8, 1926.
16Ibid., March 1, 1930.
17Ibid., July 3, 1926.
England, France, Argentina, Canada, and the United States.\textsuperscript{19} The only large and important project of this type which has received consideration in the United States is the Passamaquoddy tidal power project near Eastport, Maine.\textsuperscript{20}

\textsuperscript{19}Richards, loc. cit.

\textsuperscript{20}In 1928 a John A. Knowlton was brought to trial in a Federal court in Boston for promoting a tidal scheme at Saugus, Mass. In the testimony given at the trial, it was brought out that the energy developed would have cost \$1.08 per kilowatt hr. The ordinary cost of energy was less than one cent per kilowatt hr. Knowlton sold nearly a million dollars worth of stock. \textit{Eastport Sentinel}, May 30, 1928.
CHAPTER I

PASSAMAQUODDY

Passamaquoddy Bay is an arm of the Bay of Fundy on the coast of North America between Maine and New Brunswick, Canada. Separated from the Bay of Fundy by a fringe of islands, it lies in an area which is famous for its tides. At the head of Fundy occur the highest tides on the earth, often reaching heights over fifty feet. Tides at Passamaquoddy range from thirteen to twenty-six feet, with an average rise and fall of eighteen feet. About two billion tons of water are carried into the bay twice each day. Here, as elsewhere on the earth, gravitational pull of the sun and moon is the basic force which moves the water, although local circumstances cause the unusually high tides. Fundy is at the end of a basin, the Gulf of Maine, which experiences an oscillating or rocking motion which coincides with the tide and heightens it.

...the narrowing and shallowing of the bay in its upper reaches, compelling the huge masses of water to crowd into a constantly diminishing area also contribute to the great heights of the Fundy tides.

Along with high tides, nature has provided a coastline with the types of bays which make the area especially attractive for

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1 The name comes from an Indian word, "Peskutam-akadi," meaning "Pollack-plenty-place." At certain times of the year the bay throngs with these fish. Fannie Hardy Ecstorm, Indian Place Names of the Penobscot Valley and the Maine Coast, Orono: University of Maine Press, 1941, p. 227.


4 Ibid.
a tidal scheme. Passamaquoddy, about one-hundred square miles in area, forms one of these natural basins. Connected to it by passageways is another bay, Cobscook, about forty-six square miles in area—an ideal setting for the dream which has so long intrigued man's imagination.

In 1836, Charles T. Jackson visited the region while making a geological survey, and remarked on its possibilities. "Haycock's Harbor (near Lubec) offers a favorable situation for the use of tide power; the mouth of the harbor being narrow, so that a dam could be thrown across it." Walter Wells, in a study of Maine water power in 1869, predicted that tidal power sites would eventually be harnessed in Maine. In 1912, a man named Thomas McDonald arrived at Eastport, Maine, from Patterson, New Jersey and exhibited a model of a two-pool tidal project. McDonald, who was not an engineer, did little to promote his plan and nothing came of it.

In an address at Eastport, Maine, in 1920, Franklin D. Roosevelt, then Assistant Secretary of the Navy, commented on plans being made for the development of power from the tides. It is believed that he was referring to Passamaquoddy. Roosevelt, who learned to sail on the waters of the bay as a boy, discussed the

5 Jackson, op. cit., p. 36.
7 Eastport Sentinel, October 29, 1924. Roscoe Emery, former publisher of the Sentinel, described McDonald as a "somewhat erratic genius."
8 From an interview with Roscoe Emery, December 22, 1954, at Eastport, Maine. At the time Passamaquoddy was also being considered as a training area for the Atlantic Fleet. Sentinel, July 28, 1920.
idea of harnessing its tides again in 1921. "I talked with Owen Young of the General Electric about the possibilities of the Bay of Fundy. He was much interested and they made a preliminary rough survey...." Roosevelt added that the demand for power did not justify any further steps at the time.9

The late Dexter Parshall Cooper, a husky, impressive-looking hydro-electric engineer, is generally recognized as the father of the Passamaquoddy tidal project. A sincere, imaginative, and successful engineer, described by a close associate as a man with a "very fertile and ingenious mind,"10 Cooper claimed to have conceived the Passamaquoddy tidal power idea around 1912.11 He later patented his plan and for about fifteen years led a campaign "not only as an engineer, but as a diplomat and politician on behalf of the project."12 Cooper was born in Rushford, Minnesota on July 10, 1880, and received his early education in the town of Black River Falls, Wisconsin. The son of a bridge builder and brother of one of America's pioneer hydro-electric engineers, family tradition and devotion to his older brother led Cooper into the engineering

10Statement by Moses Pike, who served for many years as Cooper's assistant on the project. December 28, 1951. "Mr. Cooper's record as an engineer of mighty projects protected the plan (Quoddy) from being labeled as a dream," New York Times, Feb. 3, 1938.
11Sentinel, March 25, 1925. In 1925, a Boston lawyer, Jerome Petitti, protested Cooper's claim as the originator of the tidal scheme. Petitti stated that he made the plan before Cooper. Bangor Daily News, April 1, 1925.
profession. At seventeen he left home and got a job on a forge in an engineering camp. He advanced rapidly as a workman, and two years later, at the age of nineteen, he was bossing a crew of 1,400 men on the Sao Paulo power dam in Brazil. Another job took him to Jamaica in the West Indies. Realizing that he would need more education in order to advance in the engineering profession, Cooper decided to continue his education. He was encouraged by his brother and friends to do so; therefore, he went to Saint Gallen, Switzerland, and attended a preparatory school. Later he enrolled in the Royal Technical Institute at Karlsruhe, Germany, and graduated eventually as a mechanical engineer.

After securing his degree from Karlsruhe, Cooper returned

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13 Colonel Hugh Cooper, older than his brother, Dexter, by fifteen years, was more prominent as an engineer. He held an honorary degree from the University of Missouri, was an honorary engineering professor (Government School of Engineering, Brazil, S. A.), and authored many articles on engineering. Colonel Cooper constructed hydro-electric dams in Africa, South America, Europe, Canada, Mexico, and the United States. His work on the Dnieprostroy Dam in the Ukraine (the world's largest until the Boulder Dam) brought him into contact with Joseph Stalin. For his work as consulting engineer on the Dnieprostroy Dam, Cooper received the Order of the Red Star in 1932—the first foreigner to receive the citation. New York Times, June 25, 1937; and Who Was Who in America, 1942, Vol. 1, p. 258-259.

14 New York Times, September 27, 1925. There are other versions of Dexter Cooper's early career. His wife stated that he completed high school, got a job with the Chicago Bridge and Iron Works, and later was hired by his brother to work in Brazil. From an interview with Mrs. Cooper, August 13, 1951.

15 A well educated Portuguese became interested in Cooper while he was in Brazil. He persuaded Cooper to secure more education and arranged with brother Hugh to send Dexter to a Swiss preparatory school. Statement by Mrs. Cooper, August 13, 1951.

16 Years later when Cooper died, Colonel Philip B. Fleming, chief engineer on the Quoddy project in the 1930's, said of Cooper: "...A project backed by an engineer of Mr. Cooper's reputation could not be ignored. He had wide experience....He was equipped with a technical education perhaps superior to that possessed by any other engineer in this country." Sentinel, March 16, 1938.
to the United States where his career in engineering continued. His work included engineering reconnaissance in West Virginia, Connecticut, and Washington. He worked on the electrification of the Milwaukee and St. Paul Railway in Montana, and gained experience on power projects in California. 17 A large undertaking with which he was associated was the Keokuk Dam, a $35,000,000 project on the Mississippi River. Cooper, about thirty years old at the time, was in charge of construction. His brother, Hugh Cooper, was the chief engineer. 18 Dexter Cooper’s work then took him to Chile where he was employed on a multimillion dollar hydro-electric project for the Chile Exploration Company. He served as a member of the power section of the Council of National Defense during the first World War, and afterwards was employed by the Canadian government to investigate and report on power plans at Niagara and on the St. Lawrence waterway. He worked on a 620,000 horsepower project, the Wilson Dam, at Muscle Shoals, Alabama, as an assistant to his brother who was the engineer in charge of construction. 19 Altogether, the Cooper brothers designed and constructed in different parts of the world, about a quarter billion dollars of hydro-electric projects. 20

While working on the Keokuk Dam in Iowa, Dexter Cooper met his future wife, Gertrude Sturgis, the daughter of a Boston physician,

17 New York Times, September 27, 1925. Cooper was an outdoorsman, fond of skiing and an accomplished horseman. He spoke several languages fluently. From an interview with Mrs. Cooper, August 13, 1951.
18 Sentinel, March 25, 1925.
19 Ibid.
and after a courtship of several months, they were married on April 24, 1912. They spent their honeymoon in a Sturgis family cottage at Campobello, New Brunswick, Canada, one of the islands which bound Passamaquoddy Bay. There, for the first time, Cooper observed the power of Passamaquoddy's tides, although several years passed before his idea for a tidal power project became active.21

In 1919 Cooper suffered an attack of appendicitis which required an operation. He was brought to Campobello to convalesce, and the family stayed at a boarding house in the village of Welchpool, which overlooks the bay. Here Cooper began to get interested in the "mighty coming and going of the tides."22 He put a tide gage on the dock near the house where they were staying in order to observe more closely the rise and fall of the water in the bay.23

21 Sentinel, March 25, 1925.
The writer is uncertain about the exact year in which Cooper became actively interested in Passamaquoddy's tides. Mrs. Cooper stated that her husband did not show any active interest until the period of his convalescence.

23 "We used to get up during the middle of the night to go to the dock to read the gage and observe how much the tide had risen or fallen. I would hold a lantern while he (Mr. Cooper) read the gage." Statement by Mrs. Cooper, August 13, 1954.
CHAPTER II

COOPER'S PLAN

Cooper's interest in the tides grew at Campobello. As he studied the bay, there grew in his mind a project for converting the force of the tides into electrical energy. He began making graphs of the tides; and after he and his family returned to their home in Buffalo, New York the idea obsessed him. One of the rooms in the Cooper home at Buffalo was used by draftsmen in his employ, and during slack periods in their work, Cooper gave them the tidal project to work on.¹

While visiting Westinghouse to get prices on machinery for the project, the president of the company heard of Cooper's presence, sent for him and suggested that Westinghouse help finance a survey of the plan.² Other power companies became interested—General Electric, Midwest Utilities (Central Maine Power Company), Boston Edison Company—and all put up money for the survey.³ In 1924 Cooper moved to Campobello with his family, bought a home in the village of Welchpool, and devoted himself to the project.

News of Cooper's idea reached nearby towns on the American side of the border early in 1924. There was some skepticism at first, but after learning more about the scheme and Cooper's reputation as an engineer, confidence grew and the people became

¹Statement by Mrs. Dexter P. Cooper, August 13, 1954.
²Ibid.
³Sentinel, April 4, 1934.
optimistic. The Sentinel reported that if the plan went through, it would "solve the employment problem forever." A Robbinstorn news item read, "Everyone is talking about Cooper's 'Big Dam' and most of us think it is a 'dam big job,' but let us hope that it materializes." There were rumors that Henry Ford was interested.

In 1924 Cooper filed an application with the Federal Power Commission for a preliminary permit to build his project. Upon receipt of his application, the executive secretary of the Commission stated "while there is some reason to question the feasibility of such project at the present time...its magnitude and the public interest which is attached seem to justify its investigation." The Commission decided to refer the matter to the International Joint Commission before issuing a permit.

Meanwhile, initial surveys began. Cooper set up an office in the Post Office Building at Welchpool, Campobello. He hired several Canadian fishermen and a crew of engineers and technicians to help him with the work, and they spent the summer and fall of 1924 making tidal measurements, surveying, and checking the high and low

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1 Ibid., October 29, 1924.
2 Ibid., January 30, 1925. A front page headline in the Sentinel read: "What's This? What's This? Quoddy To Be Scene of Tremendous Power Development."
3 Ibid., March 25, 1925.
4 Bangor Daily News, November 21, 1924. Lubec offered Henry Ford all the land he wanted if he located a plant there. Ford replied that he would accept if he decided to build.
6 The project came under the U. S. government through the Federal Power Commission which has jurisdiction over boundary streams. The approval of the International Joint Commission was necessary under Article IX of the Treaty of 1909.
water levels of the different areas of the dam sites.10

Cooper's plan consisted of four major parts: A series of
dams, several navigation locks, a powerhouse, and over one hundred
gates for filling and emptying the basins.

Picture the upper portion of Passamaquoddy Bay with its
water impounded by dams connecting the islands and extending to
the mainland...Cobscook Bay similarly shut off from the sea by
dams, but with the tide kept out.11

Passamaquoddy Bay, the upper pool, would serve as a
storage basin or source of power. Cobscook Bay would be the lower
pool and between the two basins would be the powerhouse for gener­
ating electricity. Gates would let water in the upper pool as the
tide rose, while other gates would drain the lower pool as the tide
reached the low water mark. The upper pool would thus fill every
twelve hours on the rising tide, and the lower pool would drain
every twelve hours on the falling tide. The water level in the upper
pool would always be higher than the level of the lower pool, allow­
ing continuous generation of power.12

The operation of the plan divided roughly into a three­
phase cycle: 1) A neutral phase when all the gates in the dams
would be closed and water would flow from the upper pool to the
lower pool through the powerhouse; 2) As the tide ebbed outside the

10Bangor Daily News, September 3, November 19, and
November 26, 1921. Between 1925 and 1928, Cooper's staff was
enlarged. Many borings and soundings were made and extensive work
was done on the design of structure. Statement by Moses Pike,
assistant engineer to Cooper, December 28, 1950.
11Dexter P. Cooper, "Some Aspects of the Passamaquoddy
Tidal Power Project," The Connecticut Society of Civil Engineers,
Papers and Transactions for 1926 and Proceedings of the 42nd Annual
Meeting, New Haven: Tuttle, Morehouse and Taylor Company, 1926,
p. 29.
12Ibid., pp. 31-32.
dams and reached the level of the lower pool, its gates would open, letting all of the water out. Meanwhile, the upper pool gates would be closed and water would be flowing through the powerhouse to the lower pool; 3) When the rising tide reached the level of the water in the upper pool its gates would open and it would fill. At maximum high tide the gates in the upper pool would close and the cycle of operation would repeat.13

One of the proposed dams was over a mile in length. A series of them would stretch from Lubec to Eastport via Treat and Dudley Islands. Another group of dams would have run from Eastport to Deer Island, New Brunswick, Canada, and from Deer Island to the Canadian mainland.14 Navigation locks were to be placed at Dudley Island, Letite Passage, and between Eastport and Deer Island, Canada.15

Cooper planned to construct the dams "of loose rock with a sand and clay blanket for waterproofing." He estimated that the project would develop between 500,000 and 700,000 horsepower with an annual production of about 3,000,000,000 kilowatt hours.16

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13Sentinel, October 29, 1924.
14Report to International Joint Commission, 1950, p. 5.
15The navigation lock between Moose Island (Eastport) and Deer Island, Canada, was to be 666 feet long and 80 feet wide; at Dudley Island, 202 feet long and 45 feet wide. The longest dam, about 6000 ft., would have been between Eastport and Deer Island, Canada. Ibid.
16Cooper, op. cit., p. 32. Cooper stated that the power could be produced for 3/4 of a cent per kilowatt hour. Legislative Record of the 82nd Legislature of the State of Maine, Augusta, 1925, p. 125. He said that his plant could deliver power to industries bordering New Hampshire and Boston for less than one cent per kilowatt hour. Bangor Daily News, March 14, 1925.
struction would take about four years and the cost was estimated from $75,000,000 to $100,000,000.17

Cooper believed that the geographical location of his dams was ideal. "...not only are our home markets and sources of supply of raw materials easily available, but those of the world are also at our door." He spoke of the ice-free harbor at Eastport. He believed that part of the power could be sold in Maine and New Brunswick, and that the large amount of electricity developed would attract industries there. Surplus power would be sent to other parts of New England over a 300 mile long transmission line which would run from the project to a point near Boston.18

Cooper planned to organize a company to build his project, and in February, 1925, a bill to incorporate the Dexter P. Cooper, Incorporated, was received in the Maine Senate. The matter was referred to the judiciary committee for consideration,19 and on March 13, an all-day hearing on the measure was held at Augusta.20 Cooper's attorney opened the case stating that Cooper requested the right to organize a company for the purpose of creating power from the tides.

He has no desire to enter into competition with the power companies...He feels that in a few years with so much developed power manufacturing concerns will come to Maine and they will take a large part of the power...Cooper also asks in this bill that he be permitted to ship power out of the state.21

17Ibid., June 19, 1925.
18Cooper, loc. cit.
19The Legislative Record of the 82nd Legislature of the State of Maine, Augusta, 1925, p. 185.
20Bangor Daily News, March 14, 1925.
21Ibid.
The members of the judiciary committee and a large audience then "listened with rapt attention" as Cooper himself explained his plan with the aid of maps and drawings. "There are no engineering difficulties," said Cooper. "Tide predictions can be made with accuracy so that it would always be known at the powerhouse just how much power can be generated." He added that the preliminary work which he had done had convinced him that the power was available. He favored local development of the electricity but believed that the surplus power could be sold outside of Maine. Senator Charles B. Carter then questioned Cooper.

"How far did you say it is practicable to transmit electricity?" asked Carter.
"Four hundred miles or better."
"How much better?"
"Fifty miles."
"Are there any transmission lines shipping power that far?"
"I do not think so. I know of none."
"How long is the longest one?"
"Two-hundred and fifty miles."
"Is it a direct line?"
"Yes, from Niagara to Pennsylvania," replied Cooper.

Cooper then told Carter that it was less than 300 miles from the site of his project to Boston. "There is no tidal power plant built in this country is there?" asked Senator Carter. "No, sir," answered Cooper. "Have you plans and specifications for it?" "I have plans, specifications and estimates of cost," said Cooper. He added that he had done nothing about financing the project. Several men from Washington County then spoke in favor of the bill. Senator Carter

22 Ibid.
23 Ibid.
opposed it. He said that the plan which had been presented to the committee was not complete and he was not convinced that it was practical. Carter stated that the bill would change the policy of the state by allowing electricity to be exported.24

Governor Ralph O. Brewster in a message to the Legislature on waterpower also warned that the project threatened Maine's hydro-electric policy. He said that Passamaquoddy was the greatest power development ever proposed in the State and that it violated the (Republican) party policy of non-exportation of electricity. Brewster thought that it would not be good business to grant the company a charter before it had secured financial backing, and he questioned its practicability.

The opinion has been very commonly expressed that this project was phantom of the imagination and apparently its passage is facilitated by consideration of that sort.25

In the Senate an amendment was added to the measure which included: 1) that the capital stock of the company should not exceed $1,000,000; 2) that the company could issue bonds for construction subject to the approval of the Public Utilities Commission; 3) that the allocation of power between the United States and Canada would be determined by the International Joint Commission; 4) that the power allocated to the United States could be sold outside the State of Maine provided the demands for electricity within the state had been met and subject to the approval of the Public Utilities

A majority of the judiciary committee favored the act, and it was brought before the Senate again in April. Senator Carter again led the opposition. He moved to postpone the bill indefinitely, and then made a speech against it. Carter stated that it had not been shown that the project would be financed and he believed it impossible to overcome some of the construction problems in the building of the dams. He said it would be a violation of both State law and party policy to permit power to be sold beyond the borders of the State. As to the plan, declared Carter, "...it never has been done, it exists only in the vision of one man—he offers no real facts, he overcomes no obstacles as to the physical performance or creation of his dams...."27

Senator Frederick Hinckley, on the other hand, defended Cooper's bill, for in his opinion the proposition was "fraught with wonderful possibilities" and Cooper one of the world's greatest hydraulic engineers. The sympathetic Senator felt that Cooper's plan should be given a chance even though its feasibility had not been proved. Hinckley declared that the people of Maine were protected under the act and that the idea went beyond the confines of a mere party platform. "It is a new proposition. It means to go into the ocean...and develop hydro-electric power." Hinckley said that the act protected citizens of Maine in that no power could be sold outside the state by the Company until every person in Maine had been

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26 Maine Legislative Record, 1925, pp. 1251-1252.
27 Ibid., p. 976.
supplied with all that he wanted at a price fixed by the Public Utilities Commission. 28

Senator Carter's motion to postpone the bill was defeated by a vote of 19 to 9 in the Senate. In the House, Representative Earl Wing protested the measure, calling it "an entering wedge to break down the authority of the State...." He added that if the bill could be amended so as to keep the power in Maine, there would be no objections. 29 Representative Robert Hale favored it, saying that the development would mean millions of dollars spent in Maine at no cost to the state. He did not believe that it would mean a new electric power policy for the State. He thought that Cooper's plan was a "unique case." Representative James Beckett declared that the people of Washington County had faith in the proposition and in Mr. Cooper. "We believe that this means the development of Washington County, and the development of Washington County means the development of the State of Maine...." 30 The House voted 132 to 0 to pass the Act. The amended bill which was sent to the Governor for his signature contained a referendum submitting the question to the people of Maine at an election in September. 31

There was some feeling that Governor Brewster would veto the measure when it reached him. 32 A wave of telegrams and letters flooded the legislators urging them to support Brewster and a

28Ibid., p. 980.
29Ibid., p. 1068.
30Ibid., p. 1071.
31Acts and Resolves of Maine, 1925, Ch. III, p. 437.
32Bangor Daily News, April 10, 1925.
possible veto of the charter. One newspaper reported that the State House corridors were "charged with feeling" over the rumored veto and that "the Washington County delegation nearly blew up under the strain." Brewster signed the bill, however, on April 11, 1925. "Whatever the merits of the bill a question that is debatable," read the Portland Sunday Telegram, "it was good politics to let the bill go along for the defeat of it would have made Washington County Democratic beyond a shadow of a doubt."

Cooper and his supporters immediately began to prepare for the September referendum vote on his charter. A series of public meetings were held at Eastport, Lubec, Calais, and Machias at which Cooper spoke, outlining his plan and asking for support. Representatives of several local Chambers of Commerce met to organize a statewide publicity campaign. In June Cooper began an automobile tour of the state, "making speeches wherever he could collect a crowd." He spoke at Portland, Auburn, Augusta, Caribou, Woodland. He visited every county and almost every town in the state. Often he made two or three speeches a day.

At Bangor, Cooper spoke at a Chamber of Commerce luncheon to an audience of 125 people. Before he was introduced, the chair-

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33 Ibid., April 11, 1925. Some legislators blamed the Ku Klux Klan for the telegrams and letters.
34 Ibid., April 13, 1925. At a meeting of the Order of the Eastern Star at Lubec, the entertainment committee presented a "Fashion Review." One of the participants, dressed in overalls and carrying a pickaxe, represented a worker on the Quoddy Dam. Bangor Daily News, April 14, 1925.
35 Portland Sunday Telegram, April 12, 1925.
37 New York Times, September 27, 1925.
38 Ibid.
man read a poem entitled, "Quoddy Bay."

When he dammed the Mississippi,
    people said that he was dippy....
When he tackled Muscle Shoals with
    its shifting sands and holes,
The natives held their sides and
    laughed with glee....
They thought the fight was lost 'ere
    it begun....But both these
things were done and now he plans
    great things for Quoddy Bay....
For 'twill bring us wealth and fame
    and add glory to his name
When Cooper builds his Dam at
    Quoddy Bay.39

Cooper then told the audience that the demand for electricity was increasing. "We must see to it that our resources are developed and brought into activity; dormant wealth is covetousness while productive wealth is conservation." He said that Quoddy was an attempt to use a natural source of power and that its progress had been delayed by one of the traditions of the State.40 Cooper cautioned his listeners, "are the people of Maine going to allow a political phantom to deprive them of an investment which will create and not take away; a project which will mark a step in the progress of production of electricity...?" Cooper felt that it mattered not who planned or financed the scheme as long as it would benefit the people. By supporting it, said Cooper, "We will not only contribute to a progressive movement, but we will advertise to our neighbors and to the world, that we are friendly to new enterprises." The audience endorsed Cooper's plan by a standing vote.41

39Bangor Daily News, June 19, 1925.
40Ibid.
41Ibid. Paradoxically enough, the day after Cooper's Bangor address, the Park theatre booked for a two-day run the film "Tides of Passion."
In July, 1925, Governor Brewster and a group of fifty prominent Maine businessmen visited the site of the project by steamer. Cooper went along and pointed out the features of the plan. In August, Senator Frederick Hale met with Cooper and later stated that he favored the plan. An editor of a Maine daily wrote "...There seems to be no opposition...." He added that Governor Brewster now supported it, ex-Governor Baxter, Congressman Nelson, Pattangall, the Grange, and other organizations.

Eastport prepared for the referendum. A large banner was stretched across Water Street which read "Vote for the Cooper project on September 14." Automobiles carried placards which promoted the plan, and the Eastport Dry Goods Store window displayed maps of the bays and drawings of the project. Many people visited Eastport to inspect the site of the proposed dams and discuss the idea with local citizens.

At a special state election held on Monday, September 14, 1925, the people of Maine voted approval of Cooper's charter, and Eastport celebrated the victory. A collection was taken up by local businessmen, and a fireworks display was held near the post office building. Cooper gave a brief talk, and the "ringing of bells and other such expressions of joy continued until about midnight."

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12 Ibid., July 22, 1925.
13 Ibid., August 10, 1925.
14 Lewiston Evening Journal, September 8, 1925.
15 Lewiston Daily Sun, August 20, 1925. An editor of the New York Times wrote: "Eastport which has been known as the Sardine City, will become known as the Seat of Electrical Transmission."
Cooper's original plan was international in scope. Passamaquoddy Bay, the upper pool, forms part of the northeastern boundary between Canada and the United States. The bay was to be closed by a series of dams, some of which would have extended from Eastport, Maine to the Canadian mainland in Charlotte County, New Brunswick. Authorization to construct such dams had to be obtained from the provincial government of New Brunswick and the dominion government at Ottawa. In 1925, Cooper went to Canada and conferred with the Premier of New Brunswick and members of the New Brunswick Electric Power Commission. He visited Ottawa and Fredericton, placed his proposals before the two governments, and was given hearings.

Opinion about the plan divided sharply in Canada. In general, Canadians did not receive the plan as enthusiastically as citizens on the American side of the border. A prominent citizen who spoke before the St. Stephen-Milltown Rotary Club asked for careful consideration before the plan was endorsed. The editor of the weekly paper at St. Stephen perhaps expressed the opinion of

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1The St. Croix River which flows into the bay also forms part of the international boundary.
2Evening Times Star, April 21, 1925.
3Sentinel, May 6, 1925. Canada required two separate charters since the project concerned tidal waters which are under national jurisdiction, as well as provincial property rights. Smith, op. cit., p. 235.
4Three local papers on the American side—The Eastport Sentinel, Lubec Herald, and The Calais Advertiser—promoted the project from the early 1920's. The St. Croix Courier, St. Stephen, N. B., questioned it from the beginning.
5St. Croix Courier, April 16, 1925.
many when he wrote "probably not in all time, past or present, have the people of Charlotte County been faced with a problem of such moment." He feared the loss of the "Nature endowed harbor," (St. Croix), and felt that Cooper had been too attentive to Maine and not considerate enough of Canadian interests.6

Passamaquoddy Bay and its adjacent waters are rich in fishery resources, which have been important to the people of the vicinity since colonial times. They form the basis of the local economy along with farming, the pulpwood industry, and the tourist trade.7 In Charlotte County, New Brunswick, more than two thousand people are employed in the fisheries which are worth an average $1,500,000 per year.8 The region has the greatest concentration of young herring (sardines) on the continent.9 There was some fear that Cooper's dams would destroy these fisheries and make useless about 150 herring weirs on Canadian shores of the proposed upper pool.10 "The dam scheme (sic) would not give any benefit after it was built to the fishing inhabitants of Charlotte county....the greatest benefit going to the Americans...."11

One Canadian opponent wrote that in wartime, "the dam would

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6Ibid., April 1, 1926.
8R. Day, Scientific Assistant to the Director, St. Andrews Biological Station, St. Andrews, N. B., to the writer, Jan. 14, 1955. In Washington County, Maine, there were 4,400 people employed in the fisheries in 1930, and the value of manufactured fish products was three million dollars. Report of the International Commission Appointed to Investigate the Probable Effects of the Damming of Passamaquoddy and Cobscook Bays on the Fisheries of That Region, Ottawa: King's Printer, 1934, p. 3.
9Ibid.
10Courier, April 16, 1925.
11Ibid., May 7, 1925.
be a damned nice thing for an enemy against an absolutely and un­
protected and unfortified country (sic).” The project had some
supporters in Canada, however. There were many who believed in
Cooper, who envisioned new industry being attracted to the region,
"New Brunswick as the Florida of the north," and Passamaquoddy Bay
converted into the greatest salmon pool in the world.13

At a meeting of the St. Stephen Board of Trade in March,
1926, a resolution was passed inviting Cooper to come there and
explain his plan.

...whereas opinion differs among men familiar with the
business and geographical condition in Charlotte County as to
whether the changed conditions resulting from the said proposed
development will be beneficial or prejudicial to the business
interests of the people of this county....14

Canadians were impressed by Cooper's simplicity, frankness and
sincerity during his visit, although the Courier felt that his trips
to Canada had been too infrequent.15 The St. Stephen Board of Trade
later passed a resolution favoring his dams.16

In May, 1926, a bill to incorporate the Canadian Dexter
P. Cooper Company was brought before a committee of the House of
Commons at Ottawa. Cooper, who was present, explained the bill. He

12 Ibid., April 22, 1926.
13 Ibid., April 29, 1926. The Eastport Sentinel and the
Lubec Herald held the opinion that most people in Canada favored the
project.
14 Ibid., March 18, 1926.
15 Ibid., April 22, 1926. "A little knowledge of his pro­
ject would be of much more use than constantly recurring intimations
of threats that work is to begin at once. We know what we have and
would like to know just what we are to get before a swap with a
stranger who seems to seek the background until it is 'all over.'
The rocks that he proposes to plant in our channels for all time will
not float away and will not be easily moved." Courier, June 21, 1926.
16 Ibid., June 3, 1926.
said that it would authorize the construction of dams and the development of electrical power from the tides in Passamaquoddy Bay on the Canadian side, "and supply and sell the same for use in any manner at any place in Canada and the United States of America." Several members of the committee wanted to know how the bill would affect water power rights. The question of jurisdiction arose, and the committee drafted a clause in the bill giving the International Joint Commission final jurisdiction in the matter. The bill was then delayed until various departments of the Canadian government could give their opinion as to how the project would affect navigation, fisheries, and water power rights.

In the days that followed, the committee several times postponed a decision on the act until interested members could attend. The bill also awaited the approval of Department heads, and on May 31, was given its final reading in the House of Commons. The Minister of Finance and other legislators thought that the company's right to sell power in both Canada and the United States might lead to difficulties if Canada were to forbid the export of power. The Canadian sponsor of the bill spoke in favor of it, stating that the three departments of the government, as well as the International Joint Commission had been given control over the company. He felt that Canadian interests had been completely

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17 Lewiston Daily Sun, May 20, 1926.
18 Ibid., May 20, 1926. A similar clause was contained in the Maine charter.
19 Ibid.
20 Evening Times Star, May 21, 1926.
21 Courier, June 3, 1926; and Debates of the House of Commons, Ottawa: King's Printer, 1926, Vol. 4, p. 3859-3862.
safeguarded with respect to fisheries, navigation, and power. The Act was passed on May 31, and was approved by the Governor-General of Canada on June 15, 1926.  

The Canadian Charter gave Cooper the power to build his dams, though he still had to seek approval of a similar charter from the provincial government in New Brunswick. The national charter provided that construction would have to start within three years and that before any work began, the plans would have to be submitted to the ministers of the Crown for approval. The chief reason for such provisions in the bill was the fear of authorities that the project would destroy the fisheries.

Following the incorporation of the Cooper Company at Ottawa, the investigation of the effect the dams would have on fisheries was started by the Canadian Biological Board. In January, 1928, Dr. A. G. Huntsman, Director of the Atlantic Biological Station at St. Andrews, New Brunswick, was asked to testify before the Royal Commission on Maritime Fisheries about the damage which the project might cause to the fisheries of the region. Dr. Huntsman predicted that the sardine, cod, pollock, haddock, and clam fisheries of Passamaquoddy Bay would be destroyed. "The sardine and pollock fisheries of the outer waters of Charlotte County will be wiped out,

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23 Report of International Commission on Fisheries, 1931, p. 3.  
24 The Biological Station at St. Andrews had been investigating the fisheries, biology, and hydrography of Fundy and Passamaquoddy Bays for several years. North American Council on Fishery Investigations, Proceedings 1921-1930, Ottawa: King's Printer, 1934, p. 31.  
25 Ibid.
Cooper spoke at a public meeting in St. Stephen again in February, 1928, and Canadians from all over the county came to hear him explain his project and answer questions. The town council chambers were not large enough to hold the crowd. At the meeting Cooper stated that the project was sound, that it would be financed and that the power could be sold. He promised to reimburse towns for damages to fisheries. He did not believe the bay would freeze in the wintertime as a result of the dam, and he promised to keep navigation open by means of locks in the dams, pointing out that the highway across the top of the dams would be convenient for tourists. Cooper’s attorney also spoke declaring that the plan would pay for itself and that the interests of fishermen would be protected.

The Canadian Dexter P. Cooper Company Act was brought before a committee of the New Brunswick legislature in March, 1928. The Evening Times Globe called it "the most contentious piece of legislature to come before the House." It monopolized the attention of the Corporations Committee for about three weeks and there was an active lobby for and against the bill from the opening of the session. More than seventy people, supporters and opponents,

26A. G. Huntsman, Passamaquoddy Bay Power Project and Its Effect on the Fisheries, St. John, 1928, p. 45. Other interesting predictions made by Huntsman in this report were that the bay would freeze solid every winter, the climate would change, there would be less fog in the summer, and the rise and fall of the tide would increase. Ibid., p. 45.

27Cooper promised to raise the sewers of St. Stephen if necessary. Since the town of St. Stephen is on the St. Croix River which flows into the bay, there was some apprehension about this.

28Courier, February 23, 1928.

29Evening Times Globe, March 31, 1928.
attended the hearings at Fredericton which lasted about two weeks.

Cooper was present and spoke for his bill, but the opposition he met was formidable. Representatives of fishermen from Deer Island declared that they would support the measure only if their interests were safeguarded. Other opponents of the measure included: Canadian Cottons Limited, Maritime Electric Co. Ltd., F. H. Todd and Son Ltd., The Canadian Pacific Railroad, Connors Brothers Ltd., and the towns of St. Stephen and St. Andrews.

Dr. Huntsman, for example, testified that the dams might stop bottom-to-surface water movements stirring up and mixing fish foods in the bay, thus destroying the area as a fishing ground. A representative of the Canadian Pacific Railroad feared that the region would be ruined as a "seaside resort."

The chief objection to the bill was that it did not provide any compensation security to fishermen or others whose interests would be adversely affected by the development. The bill was taken from committee and returned later practically redrafted. The House by a vote of 24 to 17, after a three hour debate, defeated an amendment to delay the Act, and the bill was approved on March 30,
1928. Several important amendments were attached to the bill in its final form: (1) that the company maintain open navigation in Passamaquoddy Bay and the St. Croix River at all times; (2) that the provinces pay charges on weir damages and be reimbursed by the company; (3) that the company deposit two million dollars in bonds with the province as a guarantee of good faith in the project; (4) that construction not begin until the Governor-General-in-Council, the Department of Marine and Fisheries and the Department of Public Works had decided if the plan would cause greater injury to Canada than the value of the development itself to Canada, and (5) that construction would have to begin within three years and be completed within six years from the passage of the Act.34

The fisheries investigation continued. Since the effects of Dr. Huntsman's predictions would have affected fishing grounds outside the national jurisdiction of either the United States or Canada, the matter was brought before the North American Council on Fishery Investigations at Boston on June 2, 1928. A resolution was passed urging both governments to make detailed studies of the production of fish foods in the region and that special attention be given to the Passamaquoddy project fisheries question.35 At another meeting in October, 1928, at Toronto, Canadian Deputy Minister of Marine and Fisheries, W. A. Found, asked the council for its opinion as to the effect of the proposed dams on the fisheries. As a result

of this request, a committee was appointed to visit Passamaquoddy Bay, "examine into conditions there, consider the plans of the power company, study all available information bearing upon the predictable effects of the project on the fisheries of the region, and report its findings to the two governments." The committee included W. A. Found, Canadian Deputy Minister of Marine and Fisheries, Henry O'Malley, U. S. Commissioner of Fisheries, Dr. H. G. Bigelow, Harvard University, and Dr. A. G. Huntsman of the Canadian Biological Board. 36

Meanwhile, fishermen and weir owners on Deer Island held a series of meetings to discuss the damages which the project would cause to herring weirs. The subject of compensation for losses was debated. All agreed "that there should be some adequate guaranty of indemnity before the project is allowed to go on." 37 Resolutions were adopted containing the demands of the weir owners with regard to indemnities, and delegates were selected to carry these demands to Ottawa.

In December, 1928, the special committee appointed by the North American Council met at Eastport, Maine, to begin its investigation. The committee brought tidal engineers from both countries to aid in the work. At the meeting, Cooper and his assistant Moses Pike explained the operation of the project. This was followed by a discussion of water temperature and the effect the dams would have on the water level of the Bay of Fundy. 38 The engineers who had been

36Ibid.
37Sentinel, November 21, 1928.
38Ibid., November 28, 1928. Pike demonstrated that the dams would raise the level of the Bay of Fundy only a few inches.
called in presented their findings, and reports were given on the hydrography, biology, and fisheries of the section. After a two-day session of conferences and discussions, the committee adjourned and in March, 1929, issued its report to the two governments:

(1) That in its opinion, if the proposed construction is carried out, the weir fisheries for herrings inside the dams will be almost wholly eliminated.

(2) That it recognizes that the effects on the fisheries outside the dams predicted in the report on the subject by Dr. Huntsman may follow, but the committee as a whole is not prepared to forecast whether these results will or will not follow, believing that a fuller investigation is needed.

The matter was referred back to the North American Council for evaluation, and the two governments decided to arrange for further investigation. The sub-committee of the North American Council after considering the matter recommended that future investigations be based on:

(a) Detailed study of the occurrence of the herring in relation to various environmental conditions as an indication of how its availability in the fishery might be affected by the construction of the dams.

(b) A study of the abundance of phytoplankton and zooplankton (as a basis for fish life) in relation to the physical and chemical states of the water in the Bay of Fundy and along the coast of Maine.

(c) Detailed examination of existing hydrographic conditions as indicating the relative importance of the water mixing at the mouth of Passamaquoddy Bay as determining the physical and chemical states of the water in the Bay of Fundy and along the coast of Maine.

The sub-committee reported that such investigations would take two years and could be carried out only by well-trained and experienced personnel. Construction of the dams, the committee

39 Ibid.
added, would be the only decisive way to determine what effects there would be on the fisheries. The two governments appointed Found, O'Malley, Sette, and Huntsman to conduct the lengthy investigation.

In the meantime, the attitude of sardine packers on the American side of the border was expressed by a cannery owner, "...We get only four per cent of the fish we use in our canneries from this bay, so the loss would not be irreparable if none were obtained there....If fish didn't come up Passamaquoddy they would go somewhere else in the vicinity, so that the canning business would not be injured in any event...." The Canadian Fisheries Association, on the other hand, went on record against the plan on the grounds that it would ruin Canada's sardine packing business. At an annual meeting of the Charlotte County Municipal Council at St. Andrews in January, 1929, the project again met with mixed reactions. One of the councilors proposed a resolution (later tabled) which was against the project on the basis that it would destroy fisheries and interfere with navigation. Another councilor defended Cooper's idea.

In March, 1929, Cooper filed a petition with the Canadian government at Ottawa for an extension of his charter which would expire on June 15, 1929. The petition was given two readings in

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42 Ibid.
43 Sentinel, December 26, 1928. The International Fisheries Commission reported that the annual herring catch inside the bay amounted to two and one-half per cent of the total annual catch along the Maine coast. Report of International Commission on Fisheries, 1934, p. 6.
44 Sentinel, January 23, 1929.
the lower house, then referred to a legislative committee for consideration. Cooper left Eastport with a delegation of Canadian citizens to testify in favor of his charter. The St. Stephen Board of Trade and the St. George Town Council also sent supporting delegations. In April, hearings began before the Private Bills Committee of the House of Commons.

The opposition, which was strong, opened the case with a review of the main objections—damage to fisheries, deleterious effects on the tourist trade, and the closing of St. Croix harbor. A representative of Connors Brothers sardine plant of Black's Harbor said that the summer business of St. Andrews would be endangered and that the power house of the project would be on the American side. Dr. Huntsman spoke, stating that fishing within the dams would be eliminated, although he was uncertain about the effect on fisheries outside the dams. He argued for delay and urged further study. A. N. MacLean, the President of Connors Brothers, gave figures on the sardine industry. He said that his company at Black's Harbor had doubled its business in four years, that between 300 and 400 people were employed, and that the industry, which would be ruined by the power project, furnished a living for between 8,000 and 10,000 people. A representative of the Canadian Pacific Railroad declared that his company favored anything that would aid Maritime development, but if Huntsman was right, he would oppose

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46 Sentinel, March 13, 1929.
47 Courier, April 11, and April 18, 1929; Sentinel, April 10, 1929.
48 Sentinel, April 17, 1929.
49 Evening Times-Globe, April 13, 1929.
the charter.

Friends of the proposed project countered with strong arguments. A member of the New Brunswick legislature said that his support was due to a desire to get new industries in the region. He pointed out that the bill provided for reimbursement in case of fishery losses. Cooper spoke for his bill, as did the Canadian sponsor of the measure, and a representative from Campobello Island. Despite this spirited defense, the committee voted 22 to 10 not to renew the company charter. Thus did the Quoddy project meet with an unhappy demise in Canada.

Cooper returned from Ottawa somewhat bitter about the defeat. In a letter to the Sentinel he wrote: "We are therefore placed in the position where we have spent over $300,000 on our work here, and have not received approval of our plans or a charter extension. I consider this procedure confiscatory." The Sentinel felt that Cooper's case had been "incompetently represented" at Ottawa and criticized Cooper for being kept on the defensive all the time.

He has been obliged to talk altogether along the lines that his project would do no harm, whereas he should have been driving home the vast benefits to be derived from it—great industrial development with its plenitude of employment and prosperity; increased tourist business; growing land values; improved communication between island and mainland; the creation of a superb international harbor. Canada heard much about possible damages from the project, little or nothing about its benefits.

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50 Sentinel, April 17, 1929.
51 Evening Times-Globe, April 17, 1929.
52 Sentinel, April 17, 1929.
53 Ibid., April 24, 1929.
54 Ibid.
Across the river, the St. Croix Courier was more sympathetic about Cooper's setback.

...this paper has never waxed over enthusiastic over the benefits to be derived from a realization of Mr. Cooper's dream. The harm that it would cause to these communities was real, while the benefits to be derived, while wonderful to think about, were problematical....one cannot but feel regret for the man whose greatest dream, and probably most important life work, has come to such a sudden ending....

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55Courier, April 18, 1929.
CHAPTER IV

THE ALL-AMERICAN PLAN

The defeat at Ottawa was not the end for Cooper. He filed a protest with the United States minister at Ottawa against the decision rendered by the House of Commons committee. Cooper claimed that he had been encouraged to make an investment of $300,000 for surveys which he said had been made worthless by the rejection of his charter. He carried his case to the State Department in Washington, and a conference was held but failed to bring results. A newspaper reported that Cooper might turn to a Canadian tidal power plan in the estuary of the Petiticodiac River at Hopewell, New Brunswick. He had been consulted about this proposal previously and had stated that the power could be developed there, although in smaller amounts and at a greater cost than at Passamaquoddy.

On September 16, 1929, Cooper filed a revised application with the Federal Power Commission for a two-pool project which would be wholly within the United States. The plan proposed initial and ultimate installations of 80,000 and 240,000 horsepower with a pumped storage plant about twelve miles away at Haycock's Harbor to be used as an auxiliary unit. The project included only Cobscook Bay which was to be divided by dams, thus making two pools. A dam creating the

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1Lewiston Daily Sun, May 3, 1929.
2Press Herald, May 10, 1929.
3Sentinel, May 1, 1929.
4Federal Power Commission, Passamaquoddy Tidal Power Project, 1929, p. 3. The estimated cost of the all-American project was about two-thirds that of the international plan, and would have produced about one half the power. Smith, op. cit., pp. 235-236.
upper pool, 22.8 square miles in area, was to extend from Carrying Place Cove (Eastport) to Denbow Neck (Lubec township). A series of dams stretching from Eastport to Lubec via Treat and Dudley islands would also have closed off Cobscook Bay from the sea, making a lower pool of 12.6 square miles in area. Dikes were planned to connect Eastport, Carlow Island and Pleasant Point. A reservoir was to be built at Haycock's Harbor for generating auxiliary power, and the power house was to be located at Carrying Place Cove. The All-American project included navigation locks, emptying and filling gates, and operated as did the original scheme. Water would pass from the upper pool to the lower pool through turbines. A group of gates would fill the upper pool on flood tide and other gates would empty the lower pool on the ebb tide. The water pumped into the storage reservoir at Haycock's Harbor was to be used again by letting it go through turbines and generating electricity which would be stored at the Eastport powerhouse.

Cooper did not abandon his original international scheme entirely. He stated that he would build on the American side and await developments in Canada. The "dams will be so arranged that the smaller project can be tied into the larger one, if and when Canada gives her consent...."

Although the fisheries question did not concern the All-

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5Report to International Joint Commission, 1950, p. 5.
7Sentinel, July 24, 1929.
8Ibid., July 16, 1930. In May, 1930, a patent was issued to Cooper for his plan. Ibid., August 6, 1930.
9Ibid., August 23, 1933. Many believed that Canada would have granted a charter had the American project been built. Smith, op. cit., p. 236.
American project, at a meeting of the North American Council on Fishery Investigations it was recommended that the fisheries investigation continue in view of Cooper's intention to build the larger international project later as an extension of his American plan.10 In the spring of 1930, a hearing was held in Washington before the House Committee on Foreign Affairs on a bill to provide $45,000 for a joint survey with Canada of the effect of the international project on the fisheries of that section. President Hoover recommended to Congress that the sum be authorized for two years to match a like sum from Canada.11 The Foreign Affairs committee voted unanimously in favor of the bill, it was approved by Congress and field work for the survey began in July, 1931.12

The scientific personnel for the fisheries investigation consisted of Dr. E. E. Watson, Queen's University, hydrographer; Dr. H. H. Gran, University of Oslo, phytoplanktologist; Michael Graham, English Ministry of Agriculture and Fisheries, ichthyologist; Dr. C. J. Fish, Director of the Buffalo Museum of Science, zooplanktologist; Trygve Braarud, assistant phytoplanktologist; and Dr. Martin Johnson, assistant zooplanktologist.13

11Press Herald, March 26, 1930. Canada passed a similar bill although there was some delay.
13Report of International Commission on Fisheries, 1934, p. 5. An honorary Advisory Council was also appointed to help carry out the investigation. It consisted of Professor H. B. Bigelow of Harvard University; Professor A. E. Parr, Yale University; Professor F. R. Hayes, Dalhousie University; and Dr. A. W. H. Needler of the Canadian Biological Board.
The investigation included a survey of the hydrography of the Bay of Fundy. Hundreds of water samples were collected for the quantitative measurement of phytoplankton. Many collections of zooplankton were examined. Herring studies included a mapping out of larvae distribution, as well as the analysis of catch records at different localities along the coast. The final report of the investigating commission was presented to the governments of Canada and the United States in October, 1933. Its conclusions, in part, were:

The physical effects of the present mixing mechanism appear to be local and although the construction of the dams would influence the hydrographic conditions in the passages, it is not expected that their influence would extend far into or beyond the Outer Quoddy Region. A sure forecast of the effect of the proposed dams on the fishery requires more comprehensive and more detailed knowledge of the biology of the herring than is available at present. There appears little probability of the proposed dams affecting the sardine fishery along the coast of Maine or even seriously at Grand Manan. The herring fishery inside of Passamaquoddy Bay would almost certainly be reduced to negligible proportions.

In 1932, on the eve of his departure to Russia to work on the Dnieper Dam with his brother, Cooper stated that economic conditions did not favor the building of his dams. He felt, however, that with business recovery, his plan would be realized. In the summer of 1933, President Franklin D. Roosevelt visited his summer home at Campobello. Eastport celebrated his arrival and afterwards

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16Sentinel, February 10, 1932. The power companies discontinued their financial support of the project because they felt it would not pay. Opinion of Moses Pike, assistant to Cooper, Dec. 28, 1954.
the editor of the Sentinel wrote "...It has been intimated that the Administration is interested in the Quoddy Tidal Power project...."
The Sentinel editor went on to say that although such intimations might not be true, Roosevelt's 1920 speech at Eastport about developing Passamaquoddy's tides was well remembered. There were rumors that the project might receive federal aid as a part of the Administration's program to solve the unemployment situation in Maine.

In July, 1933, Cooper returned from Europe. He conferred with President Roosevelt and later reopened his offices at Eastport. The Federal Power Commission was requested to survey the project in order to determine if it was feasible and economically practicable. Cooper outlined his plan to federal and state employment officials at Augusta, Maine, declaring that his project would employ several thousand men for two or three years.

Governor Brann sent telegrams to the Federal Public Works Administration and the Federal Power Commission urging favorable action. In a wire to the Public Works Administration, Brann stated:

I believe it is the almost unanimous belief in Maine that favorable action on the development of the Passamaquoddy power project will do more to relieve unemployment presently and provide industrial prosperity eventually for Maine and New England than any other individual (relief) project.

Senator Hale also urged Roosevelt to make the project a part of the
public works program in Maine, and in October, the Federal Emergency Administration of Public Works requested the Federal Power Commission to investigate and report on Cooper's application for a loan of $13,000,000 to construct his All-American project. In a letter to the Federal Emergency Administrator of Public Works on January 3, 1934, the Federal Power Commission rejected Cooper's application.

After a careful consideration of all available data, including information and estimates submitted by the applicant... the Federal Power Commission finds that the project would not be self-liquidating and cannot, therefore, recommend approval of the application.

The Commission based its investigation mainly on a review of Cooper's plans. No further surveying was done, and the conclusions of the chief engineer's report were:

No market exists in the vicinity of Eastport at this time, and there is no definite prospects of a local market... the possibility of selling the power in the Boston metropolitan area is precluded by the prohibitive cost of delivering the power to that area... This is not cheap power, but even though it might be lower than the prevailing price of industrial power in that section of Maine, heavy industries would not necessarily be attracted, since they must locate in proximity to still cheaper power... this project could not compete successfully with a tide-water steam electric plant at Eastport... The development of tidal power in Passamaquoddy Bay should not be seriously considered until after the potential water powers on the rivers of Maine have been thoroughly investigated.

Following the Federal Power Commission's unfavorable report, Cooper asked for a hearing before the Public Works Administration.

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23 Ibid., November 13, 1933. At a special session of the Legislature in December, 1933, Cooper's Maine charter was extended for twenty years. Sentinel, Dec. 20, 1933.
He believed that the "full facts" relating to his project had not been brought out in the Commission's report. He wanted to place more information before the Administration.  

On March 30, 1934, in a room of the Interior Department building in Washington, some of the best engineers in the United States gathered to hear Cooper explain his plan to the Public Works Administration Technical Board of Review. A model of the project was constructed on a table, and pertinent maps and blueprints were placed about the room. At the opening of the hearing, the chairman of the Board of Review spoke favorably of the engineering features of the scheme. He said that questions would center on economic aspects of the plan. Cooper then began to testify. He said that the cost of his power would be about seven mills per kilowatt.

For a power market he proposed to build an aluminum plant and a stainless steel plant at Eastport, and estimated that these plants would use about 68 per cent of the electricity produced. The remaining power would be sold in eastern and northern Maine. Cooper spoke of the ideal features of Eastport as a harbor, nearer Liverpool than New York and accessible to raw materials. He claimed that he could use tidal power to produce steel and aluminum more cheaply than any factory in the United States, and his charter included a request for manufacturing rights to set up such plants.

The cheap power, Cooper went on to say, would attract new industries, increase the population, and concentrate experiments in

\[27\text{Portland Evening Express, January 5, 1934.}\]
\[28\text{Ibid., March 30, 1934.}\]
the light metal industry in the northeast. He said that power from his project could be sold to public utility companies for distribution at one cent per kilowatt hour. At this point, Roger B. McWhorter, chief engineer of the Federal Power Commission, disagreed with Cooper on costs and markets. McWhorter argued that the power would not be cheap, and said that Cooper's estimates on construction costs were too low. He believed that steam production costs were lower and suggested a survey to determine production costs on power that could be derived from Maine rivers.

Others sided with Cooper. His brother, Hugh, spoke in favor of the project. Local politicians like Senator Hale and Representative Moran thought that it would help relieve the unemployment situation in Maine.29

After considering the arguments which had been presented at the March 30 hearing, the Board of Technical Review reported that it was against Cooper's plan on the grounds that it would be "economically and financially unsound," and that the time for the development was not yet ripe. The Board's opinion was that power from Cooper's project could not compete with the power from undeveloped rivers in Maine or with steam power.30 The applicant's estimates as to costs, and time needed for construction were low, went the report. Referring to Cooper's proposal to build a stainless

29Sentinel, April 4, 1934. Hugh Cooper, brother of Dexter, said: "I do not see any unsurmountable difficulties in the Quoddy project. The big industries are looking for cheap power near seaports, where they can make long term contracts." Ibid.
30Ibid., May 2, 1934. The unfavorable report of the Technical Board of Review was forwarded to Ickes.
steel plant and an aluminum plant, the Board said:

The applicant's plans for the construction of the aluminum and stainless steel plants appear not to have been worked out in as great detail as his plans for the hydroelectric development. . . without these metallurgical plants the entire project is admittedly not economically justified . . . the paramount objection to this proposed program is that its entire success depends on the profits of these two industries that will have to be developed from the ground up, both in manufacturing and in marketing . . . The applicant's estimate that he can produce the metal at a cost to him of about 50 per cent of the present market price is open to question . . . The board is of the opinion that the cost of power to be generated is not low as compared to certain existing and prospective hydroelectric plants or as compared with the production of energy by steam based on present costs of fuel at this same location . . . if the cost of fuel increases, either because of higher production costs or because of depletion of fuel supply and as the available more economical plants are developed and utilized, the time may arrive when the development of this project will be economically sound .

The Board pointed out that, in general, its conclusions agreed with recommendations made by the Maine Advisory Board, the Maine Public Works engineers, the engineering division of the Public Works Administration and the Federal Power Commission.

Proponents of the project did not take this defeat lying down. Representative Moran challenged the report, calling it "theoretical." He believed that the P. W. A. figures were inaccurate and declared that the Board of Review had yielded to the aluminum trust. He said that actual figures showed that Quoddy power was cheaper. Plans were made to send a delegation of Eastport citizens to Washington to urge approval of the plan in spite of its rejection by several government agencies. Some citizens urged that the case be taken directly to the President. The Bangor-Brewer

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31 Lewiston Evening Journal, May 1, 1934.
32 Ibid., May 3, 1934.
33 Ibid., May 8, 1934.
Democratic Club protested the Board of Technical Review's decision. Meanwhile, Cooper's application for the $47,000,000 loan was withheld. On June 7, 1934, the Public Works Administration with Ickes' approval formally disapproved the loan to Cooper.

Colonel H. M. Waite, deputy administrator to Ickes interviewed Cooper, and they discussed the adverse decision. The next day, Colonel Waite wrote a letter to Cooper. He complimented Cooper for the great amount of engineering work which he had accomplished and stated that the rejection was based not on engineering problems, but on the lack of a market for the power.

...If one could resolve the uncertainties of the sale of a great amount of additional power to the area...one is still confronted with the fact that...70 per cent of the power to be generated and about 70 per cent of the gross income during the early years is based on the successful manufacture of aluminum, stainless steel or some similar industrial operation....

Colonel Waite added that such a venture was hazardous and would involve serious commercial and financial risks. Viewed from an economic and commercial standpoint, he said, the Board was led to the conclusion that the project was unsound.

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34 Sentinel, May 9, 1934.
36 Ibid., June 8, 1934.
37 Ibid.
In July, 1934, President Roosevelt wrote a letter to Congressman John G. Utterback (Democrat) of Maine, in which he stated that he still believed in the engineering feasibility of the project, and assured Utterback of his interest. The chief executive added that the principal barrier to the tidal plan was that there was "no definite assurance for the use of the power when developed." He wrote that with other federal projects there had been some promise that most of the power could be sold, thereby enabling such projects to help pay for themselves. The President thought it possible to find a market for Quoddy power, however.\(^1\)

I have by no means abandoned hope for the Quoddy project. I do ask, however, that further efforts be made to obtain definite distribution for the power generated.\(^2\)

In an interview shortly after the President wrote his letter, Public Works Administrator, Harold Ickes, commented carefully on the President's statements. "We too, hope that it will be possible," said Ickes. He also added that first a market for the power would have to be developed. "It cannot be self-liquidating unless there is such a market."\(^3\)

Roosevelt was again quoted by Governor Louis Brann during a radio broadcast in which Brann urged the development of the Passamaquoddy plan. The Governor prefaced his address by reading a

\(^1\)Press Herald, July 16, 1934.
\(^2\)Ibid., July 18, 1934.
I am in full accord with your conviction that this is the proper time to take up in a serious way the possibility of developing the enormous latent energy of the tidewaters of the Bay of Fundy....

Roosevelt agreed with Brann that a commission should be appointed to study the proposal and the possibilities of using the power. He said that government funds were available if it could be shown that the idea was practical and would have definite uses after it had been built. The President declared that he had "high hopes" for the plan and would await the report of such commission. During the radio broadcast, Brann appointed the following commission to comply with President Roosevelt's request: Kenneth Sills, President of Bowdoin College; E. S. French, President of the Maine Central and Boston and Maine Railroads; Harry B. Crawford, Master, Maine State Grange; Wingate F. Cram, Treasurer, Bangor and Aroostook Railroad; and William N. Campbell, Executive, Sanford Mills.

Hopes for Quoddy were revived by the President's letters. The advisory and executive committees of the State Chamber of Commerce adopted a resolution endorsing the plan "as essential to the financial recovery of the State of Maine and to the permanent reestablishment of its industrial prosperity." The new Quoddy Hydro-electric Commission met at Augusta to elect officers and organize. Sills was elected chairman, and the commission invited

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4Sentinel, July 25, 1934.
5Ibid.
6Lewiston Evening Journal, July 26, 1934.
federal engineers to assist in the investigation. After a conference with the President at the White House, Governor Brann invited Ickes to come to Maine and inspect the site of the tidal plan. Ickes announced that he would reconsider his previous rejection of the project.

In the summer of 1931, Ickes, Governor Brann, and the Quoddy Hydro-electric Commission visited Eastport and Passamaquoddy Bay to examine the locality of the tidal scheme. It was a gala day for Eastport. The city was decorated with flags and bunting, the boys' band paraded, and nearly every citizen in the town was present when Ickes and Brann later spoke at the park. Ickes said that the Administration was interested in Quoddy, but that there still remained the question of selling the power. He thought that there were possible ways to develop a market, however, and encouraged the audience not to give up the fight for the idea. He called it "one of the greatest engineering feats in the world," and hoped that it would go through for the people's sake and as a reward to Cooper, "a daring engineer." After the speeches, the group inspected the site of the plan. Cooper went along and explained the details.

Meanwhile the project became a hot political issue as the September election drew near in Maine. Republican leaders, faced with prospects of Governor Brann's reelection, charged that the

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7Bangor Commercial, August 1, 1934. The P. W. A. also appointed an engineering commission which later recommended that the project be built. The members of the Commission were: Moses Pike, Dexter Cooper, Henry T. Hunt, and H. T. Corey. Smith, op. cit., p. 239.
8Sentinel, August 15, 1934.
9Press Herald, August 22, 1934.
Roosevelt Administration was trying to bribe the people of Maine into supporting the New Deal by holding out as "bait" a promise of the $7,000,000 project. Representative Bolton of Ohio, co-chairman of the Republican Senatorial Congressional Committee and Henry Fletcher, chairman of the Republican National Committee, stated jointly that the revival of the tidal plan by the Administration was a "fake." They referred to it as "...a gesture of despair. The Administration knows it is a bluff." In a speech at Portland, Maine, Bolton said:

The Maine people should not be misled by veiled promises and clever gestures...Undoubtedly, the Democratic party will be making great preparations to build the Quoddy Project up to September 10 (election day). After that date it will be found that the building of the Quoddy project will stop.

Ickes was charged with a "right-about-face" on the idea after his visit. The New York Times reported that much had been heard about the plan during the summer campaign, but little was heard before that. Ickes denied charges that the election in Maine had been "bought" and assailed as "fantastic" accusations that the P. W. A. had been playing politics in the Maine political campaign. "The partisan press and those who sought to win office on any terms," he said, had raised a "false hue and cry that he had deliberately gone into the State of Maine to buy the election."

Ickes stated that fewer projects had been approved in Maine than in

11Ibid.
12Lewiston Evening Journal, August 20, 1934.
13New York Times, October 21, 1934. Brann, a Democrat, was reelected Governor, and Eastport and Washington County, usually Republican, voted Democratic in this election. Sentinel, September 12, 1934.
any other state, and declared that if the P. W. A. had been playing politics it would have been more active during the weeks prior to the election.14

The Quoddy Hydro-electric Commission held several meetings. Markets for power were discussed, and the investigation continued despite statements that the idea would be forgotten after the election.15 Governor Brann requested that the Maine State Planning Board also study Cooper's project and submit a report on it. Senator White of Maine declared that Quoddy had been the "victim of political suggestion and political suspicion." He said that the power which the project could supply was vital to Maine's survival as an industrial state and he believed that federal aid to build it would mean the employment of thousands, a rise in the standard of living, and a contribution to the State. "There is no like opportunity north of Alabama and east of the Mississippi for a Public Works undertaking approaching this in its promise of good to so many people."16 There were hints that someone, perhaps close to the President, favored the plan.

The persistence with which the Passamaquoddy project comes back for renewed consideration after repeated reverses at the hands of various agents leads credence to unconfirmed reports that a high federal authority, perhaps closely connected with the President, is in favor of the allocation....17

In January, 1935, the Maine State Planning Board presented

15Lewiston Evening Journal, September 26, 1934.
16Ibid., January 1, 1935.
17Ibid., January 7, 1935.
a 256 page report on the Cooper proposal to Chairman Sills of the Quoddy Commission. The purpose of the five-chapter study was to furnish information "...to determine whether or not financial and human values would result to the people of the State of Maine should the Passamaquoddy Tidal Power Project be constructed by the Federal Government." The report described the raw materials of Maine and Washington County, the climate, transportation facilities, water power resources, possible industries and markets, and the social values and recreational possibilities, etc., if the Cooper dams were constructed. The Planning Board stated that the P. W. A. Technical Board of Review had rejected the project because there was no market for the power, although most other Federal power projects had been built without a definite market in view.

There were possibilities, continued the report, of several new types of industries in Maine including: nitrogen fixation,
sulphuric acid, stainless steel, aluminum, fertilizer and cement plants, woodworking and limestone mills, metal product and fish by-product factories. "Extensive and valuable deposits of raw materials" existed in Maine and Washington County which would interest industry if the tidal dams were built, went the report. These raw materials included deposits of limestone, arsenic, copper, lead, silver, zinc, peat, magnesia, aluminum silicate, feldspar, pyrite, and molybdenum. The Board declared that past experience had shown that wherever water power had been developed in the state and nation, industries had followed. For a number of years, said the report, the Passamaquoddy region had been declining in industry and population.

Chairman Sills presented the Quoddy Hydro-electric Commission report along with the Maine State Planning Board study to Governor Brann. The combined reports were submitted to President Roosevelt at the White House on January 21, 1935. The unanimous conclusions of the Quoddy Hydro-electric Commission investigation were that the project could be constructed only as a federal project and that "it should be undertaken at once...." The Commission

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20 Ibid., p. 5, also pp. 9-13.
21 Ibid., pp. 7-8.
22 Ibid., pp. 20-25. "...the question of cheap power is not a determining factor in management decisions regarding location of manufacturing plants except for certain heavy industries. Other factors such as labor, markets, and materials are the principal ones which govern these decisions." Most of the undeveloped hydroelectric sites in New England at present are a long distance from industrial centers. Report of the Power Survey Committee of the New England Council. Power in New England, Boston: 1943, pp. 44-46 and 68.
23 Ibid., p. 2.
pointed out that it would fit properly in a public works program since it would employ many people who were on relief rolls. "We would argue for federal support for this project largely on the grounds of social desirability...without definite assurance that the project would be within a specified number of years self-liquidating."24 The Quoddy Hydro-electric Commission believed that the engineering feasibility of the proposal had never been seriously questioned, and that it was impossible to predict future markets for the power because of changing conditions—improvements and inventions—in the scientific and engineering world.

If we judge the future by the past and recall how markets have often come to power sites, such, for example, as Niagara, it seems clear that industry will still seek cheap power, and it is quite within the bounds of reasonable possibility that the manufacturing of stainless steel, aluminum, fertilizer, and other similar industries, might well be developed in the Quoddy region which is through climate and proximity to Europe, particularly well adapted to such enterprises.25

The Commission stated that the project would greatly benefit Maine, because the state had lost some of her older industries such as lumber and ship building, and a substitute was needed "so that industrial life might be stirred anew." The industrialization of eastern Maine would aid the whole state and would help to relieve the unemployment problem, declared the Commission. Engineers and laymen would be greatly interested, and many people would visit the region since tides had never before been harnessed on a large scale. The Quoddy Commission concluded its report by urging the

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25ibid.
Administration to give prompt attention to the proposal, "and place it among the undertakings to be soon consummated from federal funds."  

Cooper talked with the President about his application for a loan. After conferences with P. W. A. and War Department officials, Governor Brann sent word to Maine that Quoddy would be built as a federal relief project. A $30,000,000 allotment was tentatively approved, and in May, 1935, a $10,000,000 allotment for the first year's work was signed by President Roosevelt. Army Engineers were given the job of building the project. "Pertinacity has prevailed over the best technical and economic opinion," said the *New York Times*.

The concession made to the Quoddy project is a triumph for Governor Brann. After the board of review had voted down the proposal to let the tides of Fundy make aluminum and steel, light houses, drive trolley cars and milk cows, the Governor invited Ickes to Maine and high pressured him into taking a different view... There is nothing technically wrong with the indefatigable Mr. Cooper's vision of making the moon and the sun work for us through the tides. Neither is there anything technically wrong with making bathroom fixtures of platinum. Cooper's luck was with him. Hard times for the rest of us prove to be good times for him and his supporters.

Eastport went wild over the good news. The fire alarm blew and church bells rang. Streets were crowded with people shouting and cheering. The boys' band, American Legion and fire department paraded, and people drove through the streets in their
cars sounding horns. Over at Lubec, two celebrations were held on different days. The riot call was sounded, the ban was lifted on fireworks, and free beer was provided. School children at Eastport were given a half holiday to enable them to participate in the "greatest parade of its kind ever held in the city."²⁹ "This ends the depression in Maine," said Roscoe Emery, mayor of Eastport, and when Cooper returned from Washington accompanied by Major Philip B. Fleming and Representative Ralph O. Brewster, Eastport turned out to a man to greet them. "We brought home the bacon," said Cooper. To him the day marked the triumph of his dream and to Eastport it meant the spending of money "quickly and freely, with the furnishing of many jobs."³⁰

²⁹Sentinel, May 22, 1935.
CHAPTER VI

PIGS, PIES, AND POLITICS

Cooper's dream was to be realized as a federal (War Department) project. The United States Army Engineers were to do the construction work with Major Philip B. Fleming in charge. Cooper was to act as a consultant. The construction plans were revised again to make it a one-pool scheme. Cobscook Bay was to be closed off from the sea by dams connecting Lubec, Dudley Island, and Treat's Island with the southern end of Moose Island (Eastport). Other dams were to extend from the north end of Moose Island to Carlow Island and Pleasant Point. The area of the pool thus created would have been about thirty-seven square miles. Filling gates were to be located at Treat's Island, and the plan included a navigation lock. The powerhouse to be located at Carrying Place Cove, Eastport, was to have an estimated average annual generation capacity of 175,000,000 kilowatt hours.

Operation of the one-pool development consisted of the opening of the filling gates and the filling of the pool as the tide rose. The filling gates would then close and when the ocean dropped

1Press Herald, May 17, 1935. Fleming, a West Point graduate with wide experience on engineering projects in the United States, formerly had been assistant administrator of the P. W. A. Cooper, incidentally, became a consultant who was not consulted. Statement by Moses Pike, assistant to Cooper, Dec. 28, 1934. The federal government paid Cooper $60,000 for his rights, plans, designs, etc., for the project. Sentinel, April 8, 1936.

2Colonel John Allan, superintendent of the eastern Indians during the Revolutionary War, lived on Treat's Island. Since his grave was in the general construction area on the island, the engineers moved his bones to another cemetery.
five and one-half feet below the level of the water in the pool, water would be allowed to pass from the pool through turbines into the ocean. When the difference between the lowering pool level and the rising tide level reached five and one-half feet, the power plant would stop operating until the pool filled again. The cycle of operation would then repeat.3

Work officially began on July 4, 1935, when Vice President John Garner, sitting at a desk in Washington, D. C., pressed a telegraph key which set off 600 pounds of dynamite on the site of a proposed housing development for the project.4 The blast gave Eastport more cause for celebration, and the people cheered as Major Fleming turned the first shovel full of earth. A crowd estimated at 15,000 was present for the day's ceremonies. People came to Eastport by foot, horse and wagon, train, automobile, boat, and even airplane. Many of the top engineers on the project were there. Representative Brewster and State Senator Homer Worcester were present.5 There were dinners, speeches, sports events, firework displays, dances and parades. One of the parade floats bore the inscription "Are we

3Report to International Joint Commission, 1950, p. 11. The power plant would have been shut down twice a day for several hours; therefore, in order to get a dependable supply of electricity, auxiliary power was needed. The Army engineers studied Haycock's Harbor and other places for a possible pumped-storage plant but judged them unsatisfactory. No auxiliary power site had been decided upon when work was discontinued in 1936. Ibid.

4New York Times, July 5, 1935. The Army engineers arrived in Eastport on June 27, and began making arrangements to start work. There was delay in starting because of a difference of opinion between Cooper and the Army about who was to be in charge. Roosevelt had written Cooper promising to put him in charge and reimburse him for the money already spent. Statement by Moses Pike, December 28, 1954.

5Bangor Commercial, July 5, 1935.
behind times? Not by a dam sight!"6 Governor Brann wired his congratulations to the people of Eastport. "...Your courage and faith have not wavered, and justly you have been richly rewarded.... The history of northeastern Maine will be rewritten....and I see no reason to change my opinion that the pages will be bright with achievement and opportunity...."7 The Sentinel called it "the most significant and outstanding day in the history of Eastport and all Eastern Maine," and a Millinocket attorney wrote a poem in honor of the occasion.

A babe is born! At last she comes!
Hailed by a blast of thunder
Her first breath scatters wide the earth
And rends rocks asunder....
To Dexter Cooper give we praise,
He was the brave physician
Who brought Ma Eastport safely thru
This birth in prime condition....
Hail! Hail to Baby Quoddy all!
Thou child of many a dream,
We crown thee by our fondest wish,
And hopes,—our infant queen....8

The work of organization continued as more Army engineers, clerks, and technicians arrived at Eastport to set up temporary offices in the armory and other buildings. Boxes, bales and packing cases were everywhere. Improvised desks were erected, and orders for

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6Sentinel, July 10, 1935.
7Bangor Commercial, July 5, 1935.
8Sentinel, July 17, 1935. The leader of a local dance band composed a "Quoddy Song":

After years of waiting
Now our dreams come true
All is bright around us
Skies are always blue....
Hats off to Good old Dexter Cooper
Let's give three cheers for Franklin D.
They struggled night and day,
Just to find a way, to build the Quoddy Dam for you and me.... Sentinel, Jan. 8, 1936.
raw materials were sent to dealers and manufacturers. The streets of Eastport thronged with people—natives talking of the bright future, and others looking for work. Fleming promised to give the men on relief rolls the first opportunity to work.9

A major task which faced the engineers soon after their arrival was housing for the more than 1,000 clerks, draftsmen, engineers, technicians, and workers who arrived, many with their families. It was thought that Eastport was ill-suited as a base of operations because of insufficient housing facilities. Therefore it was decided to build a model village about three miles from the city.10

Eastport became a different city. The buildings were the same, but things were different otherwise. There were few parking places and people who once could cross the street without looking, now had to watch out for traffic. Prices skyrocketed in the boom town. Rents doubled as people crowded into the city.11 Fleming warned that the Army would import its own food and supplies unless merchants cooperated in curbing profits. Land to be used as a location for the model village was priced as high as $4,000 an acre, and Fleming threatened condemnation proceedings until an elderly farmer, with tears in his eyes, patriotically offered his land to the government despite the fact that he had previously turned down

9Lewiston Evening Journal, July 1, 1935.
10Sentinel, April 8, 1936.
a high offer from speculative bidders.12

Eastport and other down-east towns were given cause for dismay and some anxiety when Representative Ralph O. Brewster charged that a Reconstruction Finance Corporation attorney, Thomas G. Corcoran, had threatened to block the project unless Brewster voted with the Administration for the "death sentence clause" of a public utilities holding bill.13 Corcoran denied the charges during a House committee investigation of alleged Administration and power company lobbying on the bill. Corcoran stated that Brewster had changed his mind at the last minute because of a "delicate political situation" in Maine, and contended that Brewster had been trying to enhance his own political prestige by the statement.14 The mild sensation caused by the Brewster charges did not help his political prestige in eastern Maine, however. People there disliked anything that would have endangered the project or caused a reaction against it in Washington. Typical of the feeling toward Brewster's speech were the words of an Eastport laborer—"Brewster shot off his mouth and he better have kept still, but that's politics; he can't stop Quoddy...."15 At Lubec an effigy of Brewster bearing the words "Our

12 New York Times, July 21, 1935. The Eastport farmer, George Rice, became a hero to one-hundred laborers who had been laid off as a result of Fleming's conflict with landholders. When Rice offered his land, the workers were recalled.
13 Ibid., July 3, 1935. "You're a liar," shouted Brewster as Corcoran testified against him during the investigation. Corcoran stated that Brewster offered not to be present at the voting and Corcoran answered, "No, nobody wants you to do any ducking. Go in and vote as you want to vote." Ibid., July 10, 1935.
14 Ibid. One writer feels that the evidence indicated that Corcoran at least inferred that if Brewster voted against the act it would have had some effect on Quoddy. Smith, op. cit., p. 248.
double crossing Congressman" hung all night in the business section of the town. Stones and other missiles were thrown at it by a crowd of several hundred people.  

Work boomed meanwhile. Relief rolls at Eastport and nearby towns were wiped out. By October, more than 2000 workers were on the job at the Village or at Spring Farm where a construction camp for laborers was being built.  

The Corps of Engineers started from the ground up gathering information and statistics for their estimates in planning. Soil conditions for the placing of foundations were studied. Many core drillings and rock borings were made. Currents were tested and tides were gauged. Engineering studies of previous plans and designs were undertaken, and hydraulic model tests were carried out. The Haycock Harbor and Calais reservoirs were investigated, and special research was made to test the erosion of various metals and the composition of concrete to withstand sea water.  

In October, 1935, the $10,000,000 allotment for the Passamaquoddy project was reduced at one stroke to $5,000,000. Newspapers reported that construction might cease unless the Maine State Legislature created an authority to dispose of the power produced by the development. There were rumors that this was a

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16 Ibid., July 15, 1935.  
18 Report To The International Joint Commission, 1930, p. 12.  
20 Ibid., Oct. 29, 1935. The federal government ran into legal difficulties in marketing the Muscle Shoals power. Possibly it had the same fears about Quoddy. The law would have created a commission with broad powers to control and operate the project. A Maine newspaper disliked such an authority, however, referring to it as a TVA for Maine. Ibid.; and Lewiston Evening Journal, April 2, 1935.
demand of the "Brain trust" in Washington.

As portions of the model housing development were completed, workers moved in with their families. The village, when completed, provided housing for more than 1000 people. There were one hundred and twenty single, two-family and four family houses. There were two apartment houses, a dormitory, hospital, guest house, fire station, dining hall, school, theatre, and an administration building. On "Snob Hill," near the village, nine permanent houses were built for Army officers and their families at a cost of about $151,000. About 5000 workers celebrated their first New Year's day on Quoddy. A sub-post office was opened, and a bus line began regular runs between Eastport and Quoddy Village.

However, in January over 1000 workers were laid off. Fleming stated that the release of workers was due to seasonal conditions, but people were fearful that the entire project would collapse. In a telegram to President Roosevelt, a committee of Lubec citizens declared "distress is acute and many are destitute.... a crisis has been created here by the exhaustion of available funds." The wire urged the President to reinstate all or part of the

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21Sentinel, April 8, 1936. The cost of the village, shops, labor camps, roads, walks, heating plant, etc., amounted to better than $2,000,000. Report To International Commission, 1950, p. 13. Representative Ralph O. Brewster charged that the Army had been wasteful in its expenditures for housing and furnishings for houses and dormitories. The Chief of Army Engineers denied this in a letter to Brewster. New York Times, February 25, 1936.

22Lewiston Evening Journal, January 7, 1936. According to the Maine newspapers and the New York Times, pressure was still on for a Quoddy Authority. Governor Brann went to Washington with a briefcase full of testimonials that Maine Legislators would consider such legislation. Ibid., December 31, 1935.
$5,000,000 allotment.\textsuperscript{23} After a trip to Washington, Governor Brann reassured the people that more funds had been made available and in January an additional $2,000,000 was allotted the development.\textsuperscript{24}

When an Army Appropriations bill came to the floor of the House in February, 1936, it was learned that the committee had disregarded recommendations of the President for $29,000,000 to finance work on non-military projects. Roosevelt had asked for $9,000,000 to continue Passamaquoddy in his recommendation.\textsuperscript{25} The report of the committee read, in part:

The committee is in thorough accord with what seems to be the future policy completely to finance such projects out of specific regular annual appropriations, but only after such projects have been authorized by law....If for no other reason, the committee feels that the total ultimate cost involved is too great for it to recommend an appropriation for further prosecution of work upon such projects until they have run the usual gauntlet of scrutiny by the corps of engineers, the legislative committees having jurisdiction of such matters, and the legislative bodies themselves.\textsuperscript{26}

The gist of the report was that if the President wanted to continue such projects with work relief money he could, but if he asked Congress for money, the project would have to take the usual course through Congress.\textsuperscript{27} Amendments putting Passamaquoddy and other projects back into the bill were submitted in the Senate by Senator Fletcher of Florida.\textsuperscript{28} Meanwhile, the first stages in small dam

\textsuperscript{23}Ibid., January 10, 1936.  
\textsuperscript{24}New York Times, January 25, 1936.  
\textsuperscript{25}Ibid., February 11, 1936.  
\textsuperscript{26}Ibid.  
\textsuperscript{27}Portland Evening Express, February 10, 1936. Work on the Quoddy project was started with relief money by executive order of President Roosevelt.  
\textsuperscript{28}Press Herald, February 21, 1936.
The project gained a new enemy in the person of Senator Arthur H. Vandenberg who started a drive in the Senate against further appropriations for Passamaquoddy, the Florida ship canal, and other relief projects. Vandenberg objected to money being alloted to such developments without an investigation by Congress. He contended that Passamaquoddy had no merits and that the government should cease its "spending for recovery...."30 In a letter to Senator Royal S. Copeland, chairman of a group in charge of a War Department Appropriations bill, Vandenberg said that he had examined unpublished reports on the Passamaquoddy project which showed that the power was too expensive. There was no market for the power, and the energy could be developed more cheaply on Maine rivers. "If the conclusions are sound," wrote Vandenberg, "the project isn't. I respectfully submit that these presumptions must be successfully rebutted before your committee is justified in lending its approval to the enterprise."31

Vandenberg said that Quoddy and other projects were being foisted on Congress without Congress having a free opportunity to study them. He said that such projects had been initiated by the President with a small allocation and then Congress was asked to complete them at a cost of many millions. "The expenditure of a few millions is used as a spring board to force expenditure of many

31Portland Evening Express, March 9, 1936. The reports which Vandenberg examined were probably the Federal Power Commission and P. W. A. investigations.
hundreds of millions," he stated. "The vice of the situation is that Congress is robbed of its opportunity for free decision..." 32

The Senate committee accepted Vandenberg's stand, and rejected a proposal that work on Quoddy, the Florida ship canal, and other projects continue. 33

Work continued on the Carlow Island and Pleasant Point dams with money from the original allocation. About 2700 people were still employed. Heavy equipment designed for the construction of the larger dams, the gates and locks began to arrive. 34 Cooper announced publicly that the project would be completed and that he had found a market for the power. 35 Conferences were held at the White House on Quoddy. Roosevelt talked with Governor Brann, General E. M. Markham, Chief of Army Engineers, and Colonel Fleming, chief engineer on the project. The Maine Congressional delegation was present. Following these meetings, Senator Hale of Maine stated that the President wanted Congress to authorize the project before he spent any more money on it. 36

In May, evidence of Democratic support of Quoddy was shown when Democratic floor leader, Robinson introduced a resolution in

32Press Herald, March 11, 1936.
34Portland Evening Express, April 6, 1936.
35Sentinel, March 11, 1936.
36New York Times, April 21, 1936. According to the New York Times, the President had the legal power to continue the project with relief funds. New York Times, June 29, 1936. Ickes stated in his diary that the President's attitude toward the project changed after an Army engineers' report raised the estimated cost from $35,000,000 to about $65,000,000. Ickes said that the President also thought that it would be unconstitutional to continue the project. Ickes, op. cit., pp. 513-514, and 542-543.
the Senate authorizing the President to set up fact-finding boards consisting of three engineers on each board, to investigate Passamaquoddy and the Florida ship canal. If the reports of these boards were favorable the resolution would have authorized the use of relief money to finance the projects for another year. The resolution drew sarcasm from Senator Vandenberg. "I've heard about the three-shell game, but this is the first time I've heard of the three-engineers' game." Vandenberg called the proposal a "back door scheme" and went on to say that it was obvious the Administration couldn't present Quoddy and the canal for a direct vote after having been defeated once.

Vandenberg introduced a series of amendments to the resolution. He wanted to increase the fact-finding board to five members and delay the report until the next session of Congress. He questioned Brann and Brewster about Cooper's claims that all the power could be sold and suggested that Cooper be called as a witness. The Senate Commerce Committee by a 12-5 vote reported favorably on the resolution. Vandenberg again announced his opposition, saying that he had sixteen amendments to offer, designed to make for "real investigations instead of shams."

If this Administration at the moment when it is sweating over the job of extracting $600,000,000 more from the taxpayers is prepared to waste one-third of that amount on two utterly

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37Press Herald, May 14, 1936. The State Democratic national convention delegation adopted a resolution favoring the plan.
38Portland Evening Express, May 14, 1936.
39Ibid., May 20, 1936. Vandenberg had a huge brown envelope on his desk filled with what he called "poison gas and dum dum bullets ready for Quoddy." Press Herald, May 27, 1936.
uneconomic projects, I'm perfectly willing to let Congress vote and the people decide whether to approve this sort of indefensible exploitation, extravagance and recklessness.\footnote{1}

The proposal for another survey of Passamaquoddy by a fact-finding board of engineers was finally defeated in the Senate by a vote of 39-28. Four Southern Senators shifted to vote against the Passamaquoddy resolution after two Maine Senators, Hale and White, voted against a similar survey of the Florida ship canal. Leaders said that Senator Hale by insisting on a division of the question was chiefly responsible for the defeat.\footnote{2}

Vandenberg in leading the attack on the two projects, talked for two hours. He said that the Robinson amendments were designed to make Congress share the responsibility with Roosevelt for starting them. "He started all these projects," roared the Michigan Senator, "but when he gets into hot water he wants us to share the bath."\footnote{3} Vandenberg called the proposal for new studies "convenient chloroform for the Congressional conscience." Observing that "we are back boondoggling on Quoddy Bay and pipe dreaming on the phantom Florida canal," he said that Quoddy had already been turned down by two government agencies. "There never was any justification for these projects and there isn't any now," he added. He described them as "an economic extravaganza..."\footnote{4} The \textit{New York Times} in an

\footnote{1}{\textit{Ibid.}}
\footnote{2}{\textit{New York Times}, May 31, 1936. Governor Brann blamed the two Maine Senators. White justified his vote by saying that he had twice previously voted against the canal. "...I do not propose by any act of mine that it be charged that a Senator of the U. S. from the State of Maine is for sale, whatever the price may be that is offered...." Hale and White, like most Republicans, had consistently opposed the canal. \textit{Press Herald}, June 2, 1936.}
\footnote{3}{\textit{New York Times}, May 31, 1936.}
\footnote{4}{\textit{Ibid.}}
editorial entitled "Log Rolling Projects" described the actions of the two Maine Senators as "a fine example of how not to do it...."

The editorial continued:

It is now admitted, though millions have already been spent or squandered, that a new and more careful study of them should be made, nevertheless the work has not been suspended. This is defended on the ground that it will give relief to unemployed men. It will not relieve the Senate, however, from the charge of having gone blunderingly and blindly ahead with legislation that is dubious and certain to run into extravagance at a time when economy is sorely needed. 45

The working people at Eastport were both discouraged and despondent. By June the working staff had been cut to 2000, and in July it had dwindled to 1000. The little overcrowded city of Eastport was clustered with shiny new store fronts ready to collapse. More money for the project was not forthcoming, and eventually the State Emergency Municipal Finance Board was asked to take over the city's finances. 46

A rough breakdown of the $7,000,000 spent on the development included about $2,000,000 for engineering—surveys, laboratory tests, design work, etc., $2,000,000 for actual field construction, $1,500,000 for the housing development, and $1,500,000 for the construction plant, stocks, supplies, field shops, land rights of way, etc. 47 Fleming announced official shutdown orders in July, although work continued on the small dams which were already being constructed. By December 31, 1936, there were only 350 men on the payroll. Project features which were completed when operations

45Ibid., June 1, 1936.
46Ibid., December 22, 1937.
47Sentinel, July 15, 1936.
ceased consisted of the Pleasant Point and Carlow Island dams, operators' residences, a diesel stand-by generating station, and other miscellaneous construction. Work had also been started on the Treat-Dudley Island dam.\footnote{\textit{New York Times}, July 12, 1936; and Report to International Joint Commission, 1950, pp. 12-13. Minor operations continued and a skeleton crew was kept on the development until June 1937.}

A story, probably untrue, which circulated at the time of the decline of the project, gave the development some unfavorable publicity. It seemed, went the story, that when the project started and thousands of people were put to work, contracts were signed with Bangor bakers to supply the commissary with 500 pies and 800 loaves of bread each day. When work on the development ceased and many people were discharged, the pies and bread continued to arrive. A farmer in the nearby town of Perry who had contracted to remove the garbage, collected the bread and pies and fed them to his pigs.\footnote{\textit{New York Times}, August 6, 1936.}

Many residents of eastern Maine, particularly Eastport and Washington County, were indignant when the Bangor Daily News printed the tale. Army Engineers denied the report, calling it "malicious slander." They secured an affidavit from the garbage collector in which he stated that he had at no time seen pie in the garbage or any wasteful disposal of food.\footnote{\textit{Ibid.}, August 7, 1936.}

Before the story was forgotten, however, the Republican National Committee got hold of it and added a verse:

This little pig went to market  
At a price too fancy and high,  
This little pig went to heaven  
(Or where the pigs go when they die);
This little pig had taxes galore
To drain and condition its sty,
And this little pig dined in grandeur
and state
On eight different kinds of pie.\textsuperscript{51}

\textsuperscript{51}Sentinel, August 19, 1936.
CHAPTER VII

REVIVAL

Even with the decline of operations and the failure of the federal government to furnish additional money for its completion, hope for Quoddy did not fade completely. Although gloomy, people in the Eastport district still looked to the President for funds to continue the development. Roosevelt visited the project in the summer of 1936 and restated his belief in the plan at a "home folks" reception on Campobello Island. "Quoddy will be completed," said the President. "I believe in Quoddy and I believe you do too...."

At a press conference earlier in the day, he had defended the idea as an experiment promising a new source of power and a solution for the unemployment problem in eastern Maine. The President added that the time would come when the tides of the region would be utilized profitably for commercial purposes, and he predicted new engineering developments which would make it possible to transmit such power to the industrial areas of New England.

But there were many who did not share this point of view. Another statesman, Senator Royal S. Copeland, chairman of the Senate

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1 The New York Times said that the President could have continued the project with relief funds previously appropriated. New York Times, June 29, 1936. Roosevelt, however, stated that the law prevented him from making such an allocation for Quoddy. New York Times, July 30, 1936.

2 Ibid. President Roosevelt made a tour of the project during this visit. He inspected the village and studied a scale model of the development while there. Upon leaving, he waved to a crowd of people who had gathered around his car and shouted "When I get back next year I hope that it will be in operation." New York Times, July 31, 1936.
Commerce Committee, believed that the project should be left to future generations. He said that Passamaquoddy would cost millions of dollars and would provide power for which there was no use.  

The model village built for Quoddy workers was destined to serve a different purpose. After considering for several weeks how the abandoned village might be used, the War Department turned it over to the National Youth Administration as a vocational training school for young men between the ages of 18 and 25. The school opened in 1937 and operated for several years. About twenty different courses were offered at the school including: sheet metal work, photography, landscaping, tree surgery, auto mechanics, electrical work, carpentry, etc.

The tidal development was not forgotten, however. Early in 1937, President Roosevelt sent to Congress a report of the National Resources Committee on Public Works Planning which contained a recommendation "for the investigation and negotiation of international construction costs and market aspects of the proposed tidal power development at Passamaquoddy Bay, Eastport, Maine...." The report, which was endorsed by Roosevelt, recommended $100,000 for the study. Representative Ralph O. Brewster argued for the project at a meeting

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3Lewiston Daily Sun, November 21, 1936. A Colby College professor at a speaking engagement in Portland said that money for Quoddy should have been used for roads. "...If this scheme goes through, $38,000,000 will be dumped into the ocean. On my way here from Waterville today I almost broke my car on a dozen rough places in the road where the money could be dumped to better advantage." Lewiston Daily Sun, May 8, 1936.

4New York Times, September 5, 1936. The school operated until 1943, when it was turned over to the "Seabees."

5Ibid., September 4, 1938.

6Sentinel, February 3, 1937.
of the Rivers and Harbors Congress in Washington, D. C. Closer to home, the Washington County Chamber of Commerce organized in February, 1938, mainly for the purpose of promoting the idea. News of Cooper's death saddened residents of Eastport and nearby towns. The "father of Quoddy" died in his Boston apartment on February 2, 1938. Friends crowded the little Anglican church at Campobello for the funeral services, and the engineer's ashes were fittingly buried on a hill overlooking Passamaquoddy Bay. Wrote an editor of the New York Times:

...Cooper failed. Yet it is out of such dreams, many of them once denounced as impracticable, that the material civilization of America has come. For every dreamer who succeeds, there must be many who try and fail; yet these too, in their fashion, help to build America. The tides of Fundy will long be a moving monument to Dexter Cooper. Some day they may be put to work.

Quoddy promoters were cheered in 1939 by news that Roosevelt had again urged a renewal of work on the development. In a letter to Representative Mansfield, chairman of the Rivers and Harbors committee, the President recommended that the project be revived in order to relieve economic conditions in Maine. Roosevelt wrote that the time would come when both Canada and the United States together would develop the larger international plan, thereby utilizing all of the energy in the bay. He suggested an appropriation to determine if it would be advisable to build a small experimental plant on the

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7Ibid., February 2, 1938.
8New York Times, February 7, 1938. Cooper was survived by his wife, Gertrude, and three children—a son, Dexter, Jr., and two daughters, Nancy and Elizabeth.
Shortly afterwards two resolutions were introduced and passed in the Senate. One of the resolutions, introduced by Senator White of Maine, asked for an investigation by engineers to complete surveys, test borings and other work as a follow-up of President Roosevelt's recommendations. The other resolution, introduced by Senator Vandenberg of Michigan, requested the Federal Power Commission to review its previous reports on the project and bring them up to date.

The Vandenberg resolution asked the Commission to report to the Senate as soon as possible on the following points: (1) the relative costs of steam generated or tide-generated power at Passamaquoddy; (2) the relative costs of the power to consumers; and, (3) whether there was a local or export market for such power. The Commission issued its report in March 1941 and again its conclusions were that Passamaquoddy tidal power could not compete with the potential river hydroelectric power available in Maine or with power from a steam electric plant in the same locality. The cost of building a tidal plant would be greater than the cost of building a steam-

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10 New York Times, January 18, 1939. A poll taken by the Institute of Public Opinion in 1939 indicated that about 73% of the people were opposed to Quoddy. Only about half the voters were familiar enough with the project to have a definite opinion. New York Times, February 12, 1939. A model of the project was taken to the New York World's Fair in 1940.

11 Lewiston Evening Journal, Feb. 1, 1939. The White resolution was reported to the House but no action was taken on it. In 1939, the Maine Legislature passed an Act creating the Passamaquoddy District Authority with powers, subject to limitations, of eminent domain, operation and maintenance of electric power facilities, and the distribution and sale of power within or outside the State. Report to International Joint Commission, 1950, p. 33.

electric plant, and the cost of the tidal power would be greater for the consumer than the cost of power from a steam plant. The Commission said that none of the power could be utilized in the immediate locality or in the State "if the rates charged for it were designed to produce revenue sufficient to cover costs...." Passamaquoddy power could not be sold in other New England states, said the report, because its cost at the load centers would greatly exceed the cost of obtaining electrical energy from other sources.

The report concluded that the demand for power was not increasing rapidly in New Brunswick, Canada, and therefore would not offer a market for the electrical output of Passamaquoddy. Undeveloped power from Maine rivers could provide the cheapest and most desirable source of power, although it was conceded that tide power had many advantages. The water supply was more dependable and predictable, and tides were not affected by droughts, floods, or ice jams. The Commission stated that the engineering feasibility of a tidal project at Passamaquoddy was recognized and accepted. As to a long range view, declared the commission:

The natural and doubtless justifiable presumption that the construction of a large international tidal power project at Passamaquoddy will not be economically feasible or desirable in the near future should be no bar to a thorough exploration of the possibility of such a project jointly by the Governments of the United States and Canada. It may confidently be assumed that the power potentially available in the Passamaquoddy tides will ultimately be developed. The event seems certain; the only uncertainty is in point of time.

Passamaquoddy went to war in 1911 when the N. Y. A. school

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13 Ibid., pp. 49-51. For its study and comparison of costs with a steam-electric plant, the Commission used an American two-pool tidal project with pumped storage.

14 Ibid., p. 48.
expanded its enrollment to meet defense needs. New courses such as radio, riveting, and aviation were added as a shift was made toward trades which would be useful in defense work. In 1943 the N. Y. A. school was terminated and the facilities of the project were turned over to the Navy as a training center for the "Sea Bees." The village served as a housing unit and other buildings and equipment were used to train the men who went overseas to build airfields and docks, etc. The tidal plan received little attention until after the war. There was some talk that the site would be made into a permanent naval base. After the war, however, the village was turned over to the War Assets Administration and put up for sale.

Hopes for reviving the project were raised again in 1947 when it was learned that President Truman had expressed confidence in the development. Truman was quoted as saying that he believed the project to be sound, and a Presidential adviser stated that the President felt that something permanent should be done about the plan. Representative Margaret Chase Smith in a speech at Eastport suggested that the federal government apply to Quoddy "the precedent which it set in the pioneering days when it made land grants to

15 Lewiston Evening Journal, January 14, 1941.
16 New York Times, September 1, 1943. At a banquet welcoming the Sea Bees to Quoddy, Governor Sewall expressed his confidence that the tidal project would be completed eventually.
17 Ibid., November 25, 1944. At various times since it was abandoned, the site or its facilities have been discussed or suggested as a possible naval base, a tractor assembly plant, a displaced persons camp, a religious school, a veterans' hospital, a salt-water swimming pool, an air base, a university, and a girls' training school. The village was sold by the War Assets Administration in 1949.
railroads...." Representative Smith advocated that the federal government share the cost of construction and operation. She stated that the development would be valuable in wartime and would provide "electric power insurance" for Maine. She pointed to the shortage of power caused by droughts in Maine in 1947.19

The Washington County Chamber of Commerce started a "revive Quoddy" campaign and sponsored a bill promoting action on the international tidal plan. In March, 1948, Congresswoman Smith introduced a bill in the House of Representatives to establish the project on an international basis. The bill proposed an authorization of $100,000,000 to finance construction, and authorized the President and State Department to "negotiate with Canada for the development and use of the waters in Passamaquoddy Bay." The measure was referred to the Committee on Public Works but no action was taken on it.20

Representatives of the Washington County Chamber of Commerce secured a meeting with President Truman in April, 1948. The Maine Congressional delegation was present, and the President was asked to order the State Department to contact the Canadian Department of External Affairs for the purpose of initiating a study of the possibility of an international project. The President did so, and by agreement with Canada the matter was referred to the International

19Lewiston Daily Sun, January 30, 1948. Electric power was rationed in Aroostook County for several weeks in 1947. Naval vessels had to supplement the electrical power for several other Maine towns in that year.

Joint Commission. Specifically, the Commission was asked to:

(1) review existing plans for the project; (2) report on the size and expense of an investigation to determine if any of the plans were practicable; and, (3) recommend a division of the expenses for such an investigation between Canada and the United States.

After receiving the request for a study, the International Joint Commission created the International Passamaquoddy Engineering Board to assist with the technical work required by the terms of the reference. Congress appropriated $30,000 in June, 1949, to carry out the work. Canada appropriated a like sum, and in the summer of 1949, the Engineering Board and the Commission began its preliminary investigation. The Engineering Board and the Commission inspected the Passamaquoddy area. Members of Parliament, Congress, government officials and representatives of industry and civic groups attended public hearings held by the Commission at St. Andrews, New Brunswick, and Eastport, Maine.

In March, 1950, the International Engineering Board submitted its report to the International Joint Commission. After studying the report and considering the views of other parties and records, the Commission reached the following conclusions:

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21 Ibid., p. 11.
22 Letter to the International Joint Commission from the United States Department of State, November 9, 1948.
23 Report to International Joint Commission, 1950, pp. ii-iii. The Engineering Board consisted of two U. S. members and two Canadian members.
24 At the hearings, testimony given by some of the Canadian witnesses indicated that there was still some fear about the effects of such a project on the fisheries. Hearings of the International Joint Commission, St. Andrews, N. B., and Eastport, Me., August, 1949.
The review of existing plans for the development of tidal hydro-electric power at Passamaquoddy Bay in Maine and New Brunswick and the evaluation of available information shows that additional information is required to enable a conclusion to be reached as to whether any one of the existing plans or other plans for the development of tidal power at this location is practicable, and is desirable from the point of view of public convenience and necessity. The critical feature...lies in the dams and as to whether or not these dams can in fact be built at the particular locations required and at a cost which is economically practicable. The question of the practicability of the construction of these dams depends principally on the foundation conditions at the respective sites. Adequate information in this connection to permit conclusions to be reached is not at present available. The scope of the investigation envisaged by the Commission's competent engineering board as necessary to determine whether an international Passamaquoddy tidal electric power project is practicable and desirable...is estimated by the Board at $3,900,000.25

The proposed investigation included a study of many of the same questions posed years ago: the effect of the project on the fisheries; an investigation of possible markets for power; further studies of foundations; hydrography, design of structures, and cost estimates. The engineering board emphasized that many of the engineering problems involved were

...unprecedented anywhere in the world and their solution will require a great deal of costly foundation exploration, field surveys, and engineering analysis. Full assurance in answer to the question of feasibility of an international tidal electric project at Passamaquoddy Bay can be given only after very careful and detailed investigations have been made.26

The Maine Congressional delegation introduced joint resolutions in the House and Senate in January 1951, authorizing

25United States Department of State, Press Release No. 1100, October 25, 1950, p. 4. The engineers estimated that the investigation would take about three years.
26Report to International Joint Commission, 1950, pp. 18-23.
$3,900,000 for the proposed survey. Canada rejected any idea of financial participation, but was willing to approve any investigation that the United States wished to make in international waters. The Maine Development Commission adopted a resolution urging Congress to appropriate funds for the study. President Truman endorsed the plan in 1952.

Early in 1953, the Maine Congressional delegation called on President Eisenhower with hopes that he would recommend the investigation. Eisenhower made no commitments. Hearings were held in Washington before a subcommittee of the House Committee on Foreign Affairs. The House Foreign Affairs Committee later voted for the investigation. The Senate approved the joint resolutions for the survey, but they were held up in the House. In 1954, President Eisenhower expressed his regrets that Congress had not acted on the

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27 Hearings Before the Subcommittee of the Committee on Foreign Affairs House of Representatives, 83rd Congress, 1st Session, Washington: Government Printing Office, 1953, p. 7. The United States Geological Survey tested new electronic sonar equipment in the Passamaquoddy Bay area in 1951. As a result, the estimated survey cost was scaled down to $3,000,000. The tests showed that there were good rock foundations where the dams would be built. New York Times, November 11, 1951.


30 Ibid., February 11, 1953.

31 At these hearings Roscoe E. Estes of the engineering firm, Thomas Worcester, Inc., Boston, testified that his company could complete the survey for $1,500,000. House Foreign Affairs Subcommittee Hearings, 1953, pp. 82-87.

resolutions, and in 1955, the President's budget contained a recommendation that $1,000,000 be used to settle the question. The Maine Congressional delegation again introduced a bill authorizing the investigation.

Thus after more than a quarter of a century of consideration, the Passamaquoddy idea for harnessing the tides to generate power still refuses to die. Debated until threadbare, exploited politically, once attempted and then abandoned by the government of the United States, the dream of Dexter Cooper to put the restless energy of the sea to work may yet be realized.

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34Lowiston Daily Sun, January 16, 1955.
CHAPTER VIII

SUMMARY AND CONCLUSIONS

Dexter Cooper's original plan was to build a tidal power project involving both the United States and Canada. He was forced to abandon this international scheme in 1929, however, when Canada refused to renew his charter of incorporation. Among the reasons for Canadian opposition was the belief that the development would destroy the fisheries and ruin the summer resort business. The Canadian Pacific railroad and other interests opposed the scheme. Cooper, an engineer, then designed a smaller two-pool tidal power project which could be constructed entirely within the boundaries of the United States, with the idea in mind that such a plan might be enlarged later to create the more desirable international project—if and when the consent of Canada could be secured.

The All-American two-basin scheme promoted in the 1930's was denounced as economically impracticable by the Federal Power Commission and the Public Works Administration. The chief reasons behind its defeat were the estimated high costs of the energy produced and the fact that no definite market for the power could be found.

Through the persistence of Passamaquoddy's supporters, and with the aid and encouragement of the late President Franklin D. Roosevelt, a firm believer in the need for electrical power, the project was reconsidered and the construction of a one-basin project was undertaken by the Corps of Army Engineers in 1935. However, the underlying motive for launching the scheme at this time was to provide work for the unemployed people in eastern Maine as much as it
was to create a power project. Before the development was completed, work had to be abandoned in 1936, when Congress refused to appropriate additional money.

The Passamaquoddy tidal project revived in the post-World War II years was a proposal similar to Cooper's original international plan. Such a project, declare its supporters, would be larger both physically and in terms of energy production than any of the 'Quoddy designs yet studied or attempted, and therefore might produce electricity at a low cost. There is little available data on an international Passamaquoddy tidal power plan since no state or government agency has ever studied all of its ramifications thoroughly. At present a bill is before Congress for a complete survey to determine its engineering and economic feasibility.

Although many of the technical problems perhaps still remain unsolved for the construction of international dams at Passamaquoddy, it seems likely that the engineering feasibility of the development is sound. Engineers and agencies who have studied or worked on the American project designs have seldom, if ever, questioned the practicability of the proposal along engineering lines. According to the Institution of Civil Engineers Journal: "Engineering problems in large tidal developments are not insurmountable and are well within the scope of modern engineering practice."

Some of the best engineers in the country have given the 'Quoddy project a vote of confidence. In 1926, when Cooper

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1 Richards, op. cit., p. 129.
received a preliminary permit to construct the international dams, the chief engineer of the Federal Power Commission stated that the project could be built. The Federal Power Commission and Public Works Administration, although questioning the economics of the American project in 1934, admitted that the idea stood up from an engineering viewpoint. Philip B. Fleming, the engineer in charge of 'Quoddy construction in the 1930's, expressed his belief in the engineering soundness of the tidal plan and also voiced an opinion that the international project could eventually be constructed. The Passamaquoddy Hydro-Electric Commission stated in 1935 that the American plan was practical, and in 1941 the Federal Power Commission reported:

The engineering feasibility of producing tidal electric power in that locality (Passamaquoddy) is generally recognized and accepted. Moreover, from the viewpoint of the construction engineer, it is not believed that there would be any insuperable obstacles to the construction of the two-pool tidal project, wholly within the State of Maine...or of a much larger international project.

After a preliminary survey of the international project in 1950, the Passamaquoddy Engineering Board concluded: "It is the opinion of the Board that an international Passamaquoddy tidal power development can be physically engineered, constructed, and operated."

The question which has haunted Passamaquoddy's promoters since the tidal plan was conceived is: What would be done with the

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3 Sentinel, January 3 and January 10, 1934.
4 Ibid., March 11 and May 13, 1936.
electrical power after the project was built? A Maine economist has suggested that building the dams might be likened to building the Empire State building in a Maine town. "For a while there would be tremendous activity in the construction area, and then what?" On the other hand, advocates of Passamaquoddy have suggested that industries would be attracted to the area by the large amounts of inexpensive power which would be available, and that Maine possesses raw materials which might be developed. Among the raw materials which promoters have recommended for possible exploitation with Passamaquoddy power are: manganese and iron-bearing ore in Aroostook County, copper deposits in the Bluehill region, and limestone, silver, lead and zinc in Washington County.°

Passamaquoddy is not a multiple-purpose development. It would not reduce floods, improve navigation, contribute to rec-

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7Opinion expressed by H. Kirshen, Professor of economics, University of Maine, Orono, Maine, July 15, 1954.
8House Foreign Affairs Subcommittee Hearings, 1953, p. 12; and Maine State Planning Board, Digest of the Technical Report on Passamaquoddy Tidal Power Project, Augusta, 1955, p. 7. Considering present available evidence, the opinion of the writer is that Maine and the rest of New England lack raw materials, excepting, perhaps, forests. Only about two-fifths of one per cent of the nation's minerals are produced in New England. The area has no coal, oil, iron, wool, cotton, hides, etc. Seymour E. Harris, The Economics of New England, Cambridge: Harvard University Press, 1952, pp. 27-30, 258. The manganese and iron-bearing ore in Aroostook County is a low grade deposit and at present is too expensive to extract. Copper in the Bluehill region is under investigation as well as certain ores in Washington County. Mines, if developed in Maine, would probably use a nominal amount of electricity. Opinion expressed by Professor Joseph Trefethen, State Geologist, University of Maine, April 21, 1955. In 1928, Dexter Cooper made a study of limestone deposits in Maine. He described a large deposit at the head of Passamaquoddy Bay and stated that the deep harbor would provide good transportation, and that the tidal power project would supply plenty of electrical energy. Dexter F. Cooper, Report on Limestones, Eastport, Maine: 1928, p. 10.
lamination, or provide irrigation, etc., as do most of the power developments in the West. "Such projects are often feasible when single-purpose ones are not. Moreover, they are cheaper because part of the costs can be allocated to each purpose."9 Cheap electrical power, if it would be cheap, seems to be the only factor warranting the development of Passamaquoddy tidal power. Although the international plan has never been thoroughly studied, the economic feasibility of various 'Quoddy tidal power plans has been debated since their origin.

In 1921, the year in which Cooper's original international scheme was publicly announced, an editor of Mechanical Engineering questioned whether it would pay—considering the isolation of the project and the high cost of transmitting the power to other areas.10 Dexter Cooper and the late President Franklin D. Roosevelt believed that Passamaquoddy power would be inexpensive, although the Federal Power Commission has consistently challenged the economics of the proposal. In 1926, when Cooper applied for a license to construct the international dams, the Federal Power Commission recommended that a permit be issued only after certain conditions had been met including "studies and estimates of cost and of market for power to show that the project is economically feasible compared with existing, competing hydro and steam stations."11

Cooper was never able to convince a federal agency that his

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10New York Times, April 6, 1921.
American project was economically sound. Both the Federal Power Commission and the Public Works Administration Technical Board of Review rejected his All-American proposal in 1934, because he could not demonstrate to their satisfaction that a definite and practical market for the energy existed. The Federal Power Commission in its review of previous Passamaquoddy plans in 1941, concluded that the electrical power from an American two-basin tidal development at Passamaquoddy could not compete with potential hydro-electric power from Maine rivers, or with power from steam plants at Eastport. The Commission stated that because of high costs, no local or export market existed for 'Quoddy power in Maine, other New England states, or Canada.

Studies in recent years, however, indicate that power needs both commercial, industrial and domestic are increasing in Maine and other New England states. The Committee of New England of the National Planning Association predicted that by 1970, the electrical generating capacity of New England will have to be doubled in order to meet New England needs. The Power Survey Committee of the New England Council in another study estimated the need for an increase in New England's generating capacity of about 1,100,000 kilowatts during the next ten years.

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12Sentinel, January 3 and January 10, 1934. In 1935 Cooper was hired by the federal government to study markets for a year at a salary of $25,000. Later he announced publicly that he had secured a market for 'Quoddy power, although he never disclosed the names of the firms.


Energy requirements in Maine at present are supplied mostly by hydro-electric developments. Additional power needs in Maine could be met from the same source. Maine, in fact, is the only New England state where hydro-electric power (exclusive of Passamaquoddy tidal power) is an important source of new power. In the other New England states energy needs are supplied chiefly by steam plants, and it is expected that future power needs in New England will be furnished by steam plants.16

The cost of electrical energy is higher in New England, on the average, than in other regions. Fuel prices, excepting oil, are high, although this disadvantage may be offset with further improvements in the efficiency of steam-plant generation or with progress in nuclear power developments.17 Although there is at present no evidence to indicate that Passamaquoddy tidal power would be cheaper than steam-plant or hydro-electric energy, if it could be shown that the international tidal project would produce inexpensive electricity, certain types of industries might be attracted to the area.18 The cost of power, however, probably has been overempha-

16 Ibid., p. 67.
18 Two economists and a geologist expressed the opinion that an aluminum reduction plant, requiring large quantities of power, would be the best type of industry at Passamaquoddy. At present, aluminum ore is shipped from South America through Portland, Maine to Canada to be refined. If the power were at oceanside, it might be cheaper to ship it there than to Canada. Statement by Professor Joseph Trefethen, State Geologist of Maine, April 21, 1955. The Federal Power Commission stated that no special merit was attached to Passamaquoddy as a site for an aluminum plant, although such a plant could be built there if low-cost power in quantity were available. Federal Power Commission, Passamaquoddy Tidal Power Project, 1941, p. 47. Other types of industries which have been recommended to absorb the energy from a Passamaquoddy project include: the
sized as a determining factor in the location of most types of industry. The Council surveying the power situation in New England has concluded that, "...power rates are of major importance in industrial growth for only a handful of industries, and in the rest they play a small but occasionally significant role along with other cost elements." Other factors such as labor, markets and raw materials are perhaps of greater significance in governing such decisions.

Canada has indicated her willingness to permit the United States to survey the international Passamaquoddy project to determine its economic and engineering practicability. Canada, however, has refused to help pay for such an undertaking. There still is fear in that country about the loss of fisheries which might result from building the dams. Authorities in Canada question the economics of the proposal and yet seem ready to consider further the matter of Canadian participation if new information on the tidal scheme suggests that such action would be desirable. In a letter to Senator Margaret Chase Smith, the Canadian Minister of Trade and Commerce declared that his personal belief was that the project would be uneconomic because of excessive power costs, and added an opinion that there would be no market for the power in New Brunswick.

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21 House Foreign Affairs Subcommittee Hearings, 1953, p. 68.
22 Ibid., p. 89.
As a matter of fact, Canada is not opposed to the project, but, rather believing it economically unsound we are not disposed to advance money for the preliminary examinations. On the other hand, we will facilitate any expenditure your government may care to make in that regard.23

The official position of Canada in regard to the project was expressed in a note to the United States Embassy at Ottawa from the Canadian Department of External Affairs dated March 11, 1953. The communication listed the following factors, in view of which, the tidal scheme did not seem practical to Canada: (1) conclusions of earlier investigations of Bay of Fundy tidal projects showing that such schemes would probably be uneconomic because of high power costs; (2) lack of evidence that there would be a market for the power in New Brunswick or adjacent areas; (3) evidence of potential low cost hydro-electric power available on New Brunswick and Maine rivers; (4) large initial capital expenditures which would be required for a tidal power scheme; and, (5) the serious effect on the fishing industry.24

The Federal Power Commission had come to similar conclusions much earlier in its review of Passamaquoddy plans in 1941. The Commission reported that the power load in New Brunswick was only about half that of Maine and therefore could not absorb the output from Passamaquoddy, at least, not for many years.25 Recent articles in the Canadian press, however, indicate an increasing demand for electrical energy in New Brunswick. Recognition of this power shortage was voiced by Premier Hugh John Flemming in his 1955

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23Ibid.
24Ibid., pp. 91-92.
New Year's message to the people of that province.

...The ever increasing demand for electrical power remains one of the principal problems faced by the government. My colleagues and I believe that national economic policy should be applied in such a way as to assist this province in developing its legitimate power requirements.26

Reaction at the grass root level bolstered the contention of the Federal Power Commission, however. The St. Stephen, New Brunswick, Town Council after contacting fifty industrial companies during one year (1954) reported that none was interested in locating in the area, the chief complaint being the high price of available electric power. According to the Council, the lowest available power rate was fourteen mills per kilowatt hour.27 New Brunswick has already taken steps to relieve her power shortage, in part at least, by constructing hydroelectric plants on her rivers.28

Any new source of power, it seems, deserves consideration in a society where progress may be measured in terms of energy consumption. Without power there can be no industry. Passamaquoddy represents a form of energy, the tides, which have been a potential since the earth's creation. Tidal energy is vast in its total amount and, if accessible, could supply a large portion of the world's needs. The energy is there; it can be seen, heard, and is perpetual and free.29 Tidal power, unlike coal, oil, or atomic energy is not a wasting asset; it is inexhaustible.

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26 Courier, December 30, 1954.
27 Ibid.
28 Ibid.
29 Eugene Ayres and Charles A. Scarlott, Energy Sources—the Wealth of the World, New York: McGraw-Hill Book Company, 1952, p. 263. All of the practical tidal sites in the world together would produce only a very small part of the world's power needs.
From the evidence which is available on previous Passamaquoddy tidal plans, it appears that energy from such a project, at present cannot compete in cost with power from other sources. Conditions favoring its development may arise in the future, however. Power needs are increasing, and the cost of coal is rising, which may hasten the day when new sources of energy will receive consideration.\textsuperscript{30} As proponents of Passamaquoddy have pointed out, an investigation of the international development may reveal that 'Quoddy power is cheaper than electricity from other sources, although other factors should also be evaluated if such a study is undertaken. The geography and topography of the region will need to be taken into account. Population trends, transportation costs, accessibility to markets and raw materials, labor supply, and energy transmission costs should be judged.

Regardless of the outcome, it seems that it would be desirable that the tidal scheme be reappraised periodically in view of changing technological and economic conditions.\textsuperscript{31} If, in the final analysis, it is shown that the power is not worthwhile economically, "...the knowledge would be well worth the cost of investigation so that Quoddy could be abandoned and the power magnates made free to consider other sources of power."\textsuperscript{32}

\textsuperscript{32}Smith, op. cit., pp. 270-271.
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Theodore Crozier Holmes, son of Oliver Wendell and Martha (MacClary) Holmes of Eastport, Maine, was born in Wakefield, Massachusetts, and received his early education in Eastport, Maine. He graduated from Shead Memorial High School, Eastport, Maine, in 1910.

In November, 1941, he enlisted in the Army Air Forces and served until December, 1945. He attended Temple University, at Philadelphia, Pennsylvania, from 1946 to 1947, and transferred to the University of Maine where he completed his undergraduate studies. In June, 1950, he received the Bachelor of Arts degree in history and government from the University of Maine, and since then has been teaching in the public schools of Maine at Dennysville, Machias, and Lewiston. He is married to Mary (Haynes) Holmes. They have a son, Stephen Oliver.

Mr. Holmes attended summer sessions in the graduate school at the University of Maine from 1950 to 1954. He completed his thesis for the Master of Arts degree in 1955.