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FOREWORD

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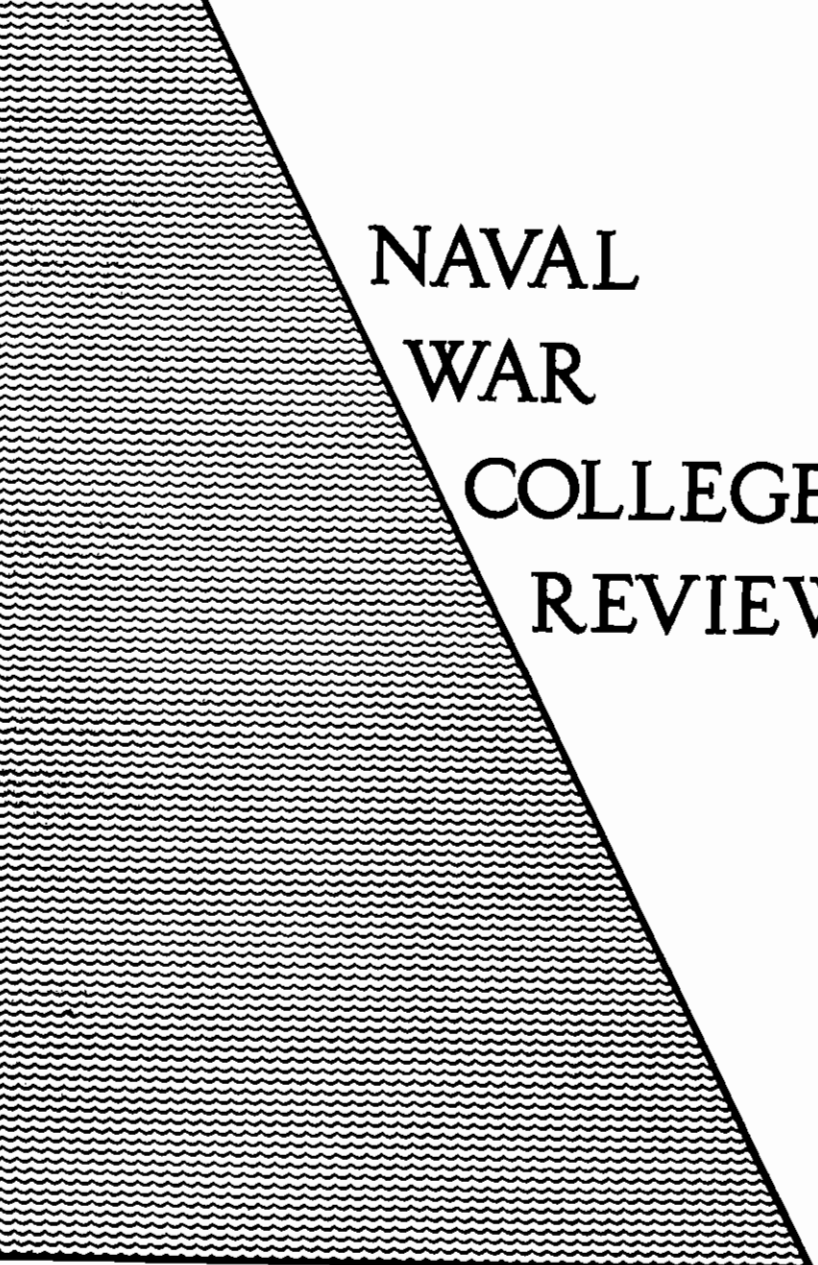
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REVIEW

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A NEW ISTHMIAN CANAL— KEY TO HEMISPHERIC PROGRESS

A Research Paper written by
Lieutenant Commander John E. Sandrock, SC, U.S. Navy
School of Naval Command and Staff, 1965

INTRODUCTION

President Lyndon Johnson announced at a White House press conference on 18 December 1964 that the United States had decided to press forward with its plans for a sea-level canal across the American Isthmus.¹ This historic announcement signaled the implementation of plans American diplomats and adventurers have discussed for years. The idea of a sea-level canal is not new; plans for such a route through Nicaragua pre-date construction of the Panama Canal itself. The President's decision to proceed with sea-level canal plans was twofold. The United States would immediately enter into discussions with interested Central American governments concerning plans for the new canal. Secondly, the Republic of Panama was advised that the United States stands willing to negotiate an entirely new treaty for the existing canal. President Johnson went on to point out that these steps are required now in order to assure the continued promotion and protection of peaceful trade and for the welfare of our hemisphere.² The Panama Canal has carried the ships of all nations on terms of complete equality for over 50 years. It has served the cause of freedom in two world wars and during the Korean conflict. It is rapidly growing old and will soon be unable to meet the demands placed upon it.

The need for a sea-level canal will be discussed only incidentally in this paper, this decision having already been made.

Rather, the author will investigate how best to proceed with the job at hand—the construction of the canal itself. Such an undertaking involves a multiplicity of complex decisions regarding economic, political, technological, and strategic factors relating to the selection of a route for the new canal. Each of these areas will be reviewed in detail. The possibility of modernizing existing canal facilities will also be investigated. Each of the five principal routes under consideration for the sea-level canal will be examined in an effort to learn their advantages and disadvantages. A cursory review of the Panama Canal as it exists today will set the stage for a better understanding of our relationship with Panama. The question of internationalization of the new sea-level canal will also be discussed. In conclusion and in the light of all factors concerned, a route will be selected as being the most advantageous for the United States. As a corollary, a course of action will be proposed which should lead to an improved economic climate for Central America and the elimination of existing friction between the United States and Panama.

Exploratory talks concerning construction of the new canal have already been held. Mr. Stephen Ailes, Secretary of the Army, and Mr. Thomas C. Mann, Assistant Secretary of State for Inter-American Affairs, acting as President Johnson's personal envoys have recently returned from Nicaragua, Costa Rica, Panama, and Colombia.⁸ The battle of the routes is on!

FOOTNOTES

INTRODUCTION

1. "U.S. Plans New Sea-level Canal and New Treaty on Existing Canal," *The Department of State Bulletin*, 4 January 1965, p. 5.

2. *Ibid.*, p. 6.

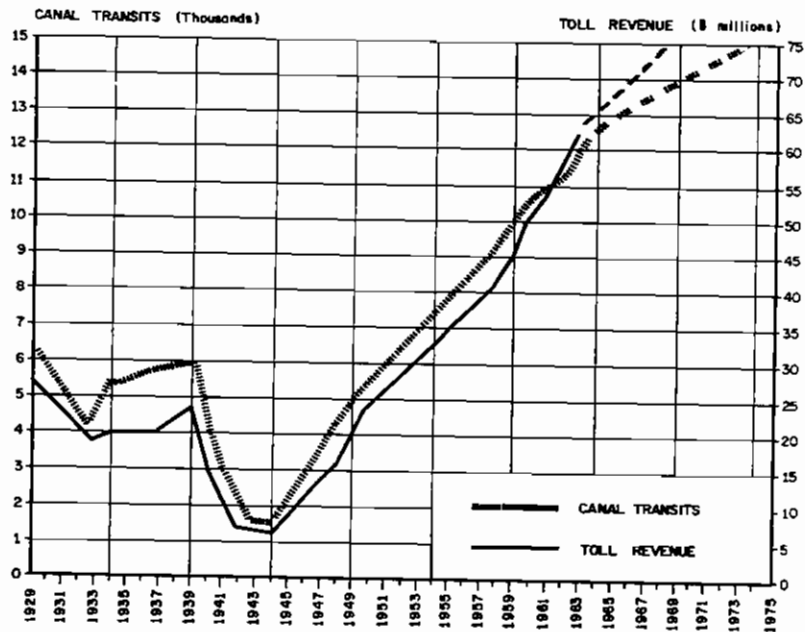
3. Benjamin F. Meyer, "Washington Begins to Move on a New Sea-Level Canal," *The Providence (Rhode Island) Sunday Journal*, 24 January 1965, p. 17.

CHAPTER I

THE PANAMA CANAL TODAY

The Problem of Obsolescence. Even the most visionary of our canal builders of 50 years ago could not have foreseen the rapid improvements in ship design and cargo handling capability that have made the construction of ships of immense proportions economical. The 1902 Isthmian Canal Act provided that the canal should be of sufficient capacity and depth to afford convenient passage to vessels of the largest tonnage and greatest draft then in use or which might reasonably be anticipated.¹ The canal locks were constructed with intermediate gates dividing them into 600 and 400 foot lengths. Their width is 110 feet. Ninety-eight percent of all ships then existent could pass into the 600-foot lock section, including the largest battleships being built. The total lock length would accommodate the largest commercial ships planned in that day—1000-foot length by 88-foot beam.² The Navy unwittingly mortgaged the future when its General Board went on record declaring the 110-foot lock width ample for its future needs. They claimed that future naval construction, in any event, would be limited to the size of available drydocks. When the canal opened for business 50 years ago an average of only five ships a day used it. Today the canal operates at near-peak capacity, traffic having doubled in the last ten years alone to its present level of 12,000 ship transits a year.³ (See Figure 1) Despite subsequent widening and deepening of the old channels the three sets of locks constitute a bottleneck to traffic. At best they can only accommodate 60 ships a day and then often involving delays up to 15 hours awaiting transit.⁴ One factor contributing to transit delay is the number of "clear-cuts" requiring special clearance. The term "clear-cut" as used on the canal refers to any vessel which must transit Gaillard Cut at less than average permissible speed due to its size, cargo, or navigational qualities. Such vessels must either be towed through the cut or proceed very slowly under their own power. While such a ship is clearing the cut no other vessel is allowed to pass it. This precautionary procedure creates a severe bottleneck with resultant delays. The trend over the years has been toward a much higher ratio of "clear-cuts" to routine transits.⁵ It is presently estimated that maximum capacity for the existing canal will be surpassed some time between 1980 and the year 2000.⁶ At present there are a total of 24 naval vessels and 50 commercial

Figure 1 - NUMBER OF CANAL TRANSITS AND TOLL REVENUE
PROJECTED TO 1975



Compiled from the following sources: Andre Stegried, *Suez and Panama*, p. 341; *Encyclopaedia Britannica*, XVII, 1962 ed., Table, p. 172B; and *Britannica Book of the Year*, 1963, Table 1, p. 631.

ships which are too large to pass through the canal at all. An additional 556 vessels cannot pass the canal while fully laden.⁷ Of these, some must reduce their cargo by 30 percent in order to lighten their draft sufficiently for passage. The 24 Navy ships too large to transit the canal ironically include all of our aircraft carriers except one—the USS *Lake Champlain*. She is the only carrier not to have received the canted flight deck conversion which bars canal passage to all others. In this regard Major General William E. Potter, Governor of the Canal Zone, while testifying before Congress stated, "The locks would have to be two and one-half times wider for the *Forrestal* class carriers to get through."⁸

The Panama Canal, when viewed from the perspective of hemispheric defense, is equally obsolete. Admiral Mahan's writings constantly stressed that communications dominate war in all its aspects. His theory was proven correct in World War I, and again during World War II, when the canal proved its military value by facilitating the movement of entire fleets from one ocean to another and by maintaining the flow of strategic raw materials for the nation's war industries. Today this picture has changed along with technological developments and strategic concepts. The Navy still relies heavily on the canal for fleet dispositions although it is frustrated in its inability to shift attack carrier striking forces from one ocean to another. The likelihood of "brush-fire" wars erupting in widely separated parts of the world is a continuing one. It is imperative that the Navy regain mobility for the deployment of carrier striking forces anywhere in the world on a moment's notice. This could not be accomplished at present without sending our ships on an extended voyage around South America, a position in which we found ourselves in 1898! Such a delay might well spell the difference between success and failure of our strategic plans. The canal's vulnerability to an atomic missile attack has been clearly demonstrated in various war games.⁹ It has been estimated that, if hit by nuclear attack or subversion, the present canal would be put out of action for from four to seven years, whereas a direct hit on a sea-level canal would incapacitate it for only a week or two.¹⁰ Admiral James S. Russell, when addressing Congress in 1960, said, "Our canal has great value in a limited war and, if not destroyed, in an all-out war. One must have less and less reliance on the military value of any fixed installation. If a sea-level canal existed it would be easier to repair after being destroyed."¹¹ The defense of the canal—if today it can be defended at all—must be fought far out in the Pacific and Atlantic and with airpower based in the United States.

The Army and Navy's withdrawal of all defensive anti-aircraft batteries and fighter aircraft from the Canal Zone stand in mute testimony to this truth.

Political Unrest in Panama. The original Hay-Bunau-Varilla Treaty of 1903 vested in the United States the monopoly, in perpetuity, for construction, maintenance, and operation of any system of communication across Panamanian territory. The treaty further granted the United States all rights, power, and authority within the Canal Zone.¹² The clause allowing the United States to intervene in order to maintain order in Panama itself was subsequently rescinded. Another series of changes raised Panama's share of canal operating profits from the original \$250,000¹³ to \$1.9 million per year.¹⁴ Otherwise, the original treaty stands unchanged. Panama has experienced a complete metamorphosis since those early days, until today treaty revision has become a national obsession. Since 1903 Panama's predominantly Indian population has increased from 125,000 persons, mostly illiterate, to over one million, 80 percent of whom are literate. Conditions for revolution in Panama have never been far from the boiling point. Over one third of Panama's gross national product is derived from canal operations. In addition to the \$1.9 million it receives in annual canal rent, Panama realizes \$25 million in the form of wages paid to Panamanian canal employees, and another \$27 million spent in Panama by American officials and their families.¹⁵ Despite this revenue, per capita income in the country remains at a paltry \$275 with unemployment steady at 12 percent. The average farm laborer receives a total of \$1.50 for a 12 hour day.¹⁶ The wage scale in Panama City is 35 to 40 cents an hour for regular labor. Yet all in Panama are not poor. The country's 800,000 mestizos (mulattos) are quick to point out the corruption and decadency of the ruling class. Approximately 40 families own all the best land, the media of information and communications, and constitute the flower of Panamanian society. They have formed themselves into a political clique. This group is not adverse to using the United States as a whipping boy and to stir up resentment against us to divert the attention of Panama's 400,000 voters from domestic grievances.¹⁷

In January 1964 uncontrolled rioting broke out along the Canal Zone border. Such incidents had occurred in the past, but this time the price of the disturbance was 21 dead and 500 injured.¹⁸ One of the principal issues behind the rioting was the flag issue. Panamanians want sovereignty over the Canal Zone to be demonstrated by the flying of their flag. The rioting started, seemingly

innocently enough, when a group of American students raised a United States flag over their high school at Balboa in defiance of the governor's order not to fly any flag at all.¹⁹ When Panamanian students were repulsed in an effort to raise their ensign alongside our own, the rioting began. Mobs of men wearing red "T shirts" and shouting "Viva Fidel" raged through the city setting fire to and destroying the United States Information Service, the Braniff and Pan-American Airways buildings, a Sears Roebuck store, and a Goodyear rubber plant.²⁰ Others carried submachine guns and homemade Molotov cocktails. President Chiari of Panama immediately broke diplomatic relations with the United States. There is ample evidence that the strategy of the rioters had been planned in advance by professional communist agitators. For one thing, Molotov cocktails take time to make and are not the handiwork of untrained amateurs. Although outlawed, Panama's Communist Party numbers about 500 hard-core members and an additional 1000 fellow travelers.²¹ Many Panamanian students have received training in insurgency in Cuba. This incident subsequently led to a charge by Panama before the United Nations that the United States violated three articles of the Universal Declaration of Human Rights by opening fire on its defenseless civilian population. The United States was later exonerated of this charge.²²

Past offers of higher wages for Panamanian workers and the flying of both countries' flags as evidence of titular sovereignty have fallen far short of Panamanian expectations. Panama's demands center around the issue of sovereignty over the canal and the Canal Zone. Panamanians have never been able to accept the fact that the United States has the legal right in perpetuity to a strip of land they consider their own. Other issues center on the abrogation of the "perpetuity" clause; greater participation in the benefits of the canal operation; equal employment conditions, opportunities, and pay for Panamanians and Americans; the cessation of commercial competition within the Canal Zone; jurisdiction over the Canal Zone ports of Balboa and Cristobal; and a voice in the actual operation of the canal, right down to insignificant issues such as the use of Panamanian postage in the Canal Zone.²³ Panamanians feel that their \$1.9 million annual canal revenue is ridiculously low and demand an equal sharing of gross (not net) canal revenues, claiming that such a distribution of revenues would increase their rental income to between \$40-\$50 million per year.

The question of Panamanian nationalization of the canal, although theoretically possible, is not too likely in view of the

willingness of the United States to revise the existing treaty and in light of construction of a second canal. Nevertheless, it has been in the minds of many Panamanians for years. There were Panamanians in Cairo within 30 days after Nasser nationalized the Suez Canal in 1956, and there were Egyptians in Panama after that. It is no coincidence that three new Arab consulates opened in Panama shortly thereafter.²⁴ Great similarities exist between the two canals in that each was constructed in the territory of an undeveloped country by powerful foreign interests and each serves as a vital and strategic waterway of Western powers.

The Panama Canal issue remains highly nationalistic and volatile. It is extremely susceptible to exploitation by Castro type revolutionaries bent upon sabotaging the remaining good will between our two countries. There seems to be no question but what the failure of Panama to modernize and reform its present outmoded political, economic, and social system has bred an atmosphere dangerous to United States interests. Unquestionably, Panama's demands border on the ridiculous. The United States, however, cannot take an unbending stand such as that advocated by the Honorable Daniel J. Flood, an outspoken advocate of asserting United States rights. Senator Flood in speaking against erosion of our rights in Panama stated, "If their flag goes up, you are a dead pigeon sooner or later."²⁵ On the other hand we must recognize that in Latin eyes the existing canal treaty should be changed to protect the welfare of Panama and the honor of the United States. We must accept evolution or run the risk of revolution.

FOOTNOTES

CHAPTER I

1. George W. Goethals, *The Isthmian Canal* (Washington: U.S. Govt. Print. Off., 1910), p. 52.
2. *Ibid.*, p. 53.
3. "Another Panama Canal: A-Blasts May Do the Job," *U.S. News & World Report*, 10 June 1963, p. 74.
4. Lawrence Galton, "A New Canal—Dug by Atom Bombs," *The New York Times Magazine*, 20 September 1964, p. 24.
5. Charles McG. Brandl, "Widening the Panama Canal," *The Military Engineer*, September-October 1962, p. 353.
6. "Still and Forever," *Time*, 22 June 1962, p. 37.
7. John W. Finney, "A Second Canal," *The New Republic*, 28 March 1964, p. 22.
8. U.S. Congress, House, Committee on Foreign Affairs, *United States Relations with Panama*, Hearings (Washington: U.S. Govt. Print. Off., 1960), p. 46.
9. Martin B. Travis and James T. Watkins, "Control of the Panama Canal: an Obsolete Shibboleth?" *Foreign Affairs*, April 1959, p. 409.
10. "The Canal's Too Small Anyway—Problem Is to Find a Better One," *U.S. News & World Report*, 27 January 1964, p. 33.
11. Committee on Foreign Affairs, p. 98.
12. International Commission of Jurists, *Report on the Events in Panama, January 9-12, 1964* (Geneva: 1964), p. 10.
13. Whenever a dollar figure is cited the author is referring to contemporary value at the time in question.

14. Leopoldo Aragon, "Has the Panama Canal a Future?" *The New Republic*, 30 July 1962, p. 17.
15. Martin B. Travis and James T. Watkins, "Time-Bomb in Panama," *The Nation*, 30 April 1960, p. 378.
16. "Uncle Sam's Canal," *The New Republic*, 13 June 1960, p. 50.
17. Travis and Watkins, "Time-Bomb in Panama," p. 380.
18. "Panama—No U.S. Backdown," *U.S. News & World Report*, 27 January 1964, p. 29.
19. Panamanian and United States flags flew side by side at seventeen select locations within the Canal Zone. Balboa High School was not one of them. No other United States flags were to be flown in deference to the feelings of the local population.
20. "Crisis over the Canal," *Time*, 17 January 1964, p. 30.
21. "Panama—No U.S. Backdown," p. 30.
22. International Commission of Jurists, p. 5.
23. Aragon, p. 17.
24. Committee on Foreign Affairs, p. 11.
25. *Ibid.*, p. 12.

CHAPTER II

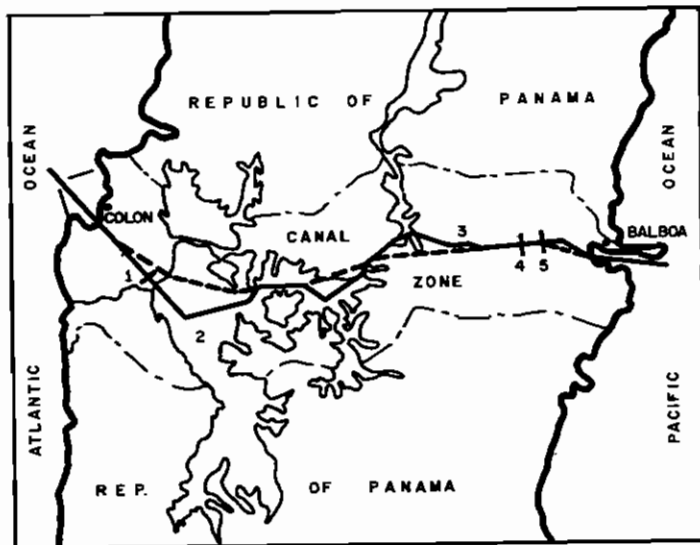
MODERNIZATION OF EXISTING CANAL FACILITIES

Current Canal Operations. Whatever is done to alleviate the restrictive dimensions of the present canal and its rapidly approaching traffic saturation, one thing is certain; a way must be found to build a bigger canal. For 25 years canal officials have recognized the need for improvement to existing facilities. Three principal plans have evolved. These are the Third Locks Project, the Terminal Lakes Plan, and a sea-level plan calling for construction of a sea-level canal at the existing site, utilizing conventional excavation techniques. To fully appreciate these alternate schemes one must have a basic knowledge of the present lock system.

The canal is 50 miles long from deep water to deep water, with a minimum depth of 40 feet. Seven to eight hours, including lockage time, is required for a ship to transit the canal. The canal complex consists of six principal features: Pacific and Atlantic sea approaches, approach terminals, channels leading to the locks, three sets of locks, the navigable lakes, and the Gaillard Cut. Ships commence transiting the canal each morning at 0600 and are dispatched from the terminals at half-hour intervals until mid-afternoon. Vessels are not allowed in the canal overnight, the locks operating as late as required to clear all shipping through the canal. Ships transiting from East to West are raised a total of 85 feet in three successive pairs of locks to the level of Gatun Lake. (See Figure 2) Ships then transit the 24-mile stretch of Gatun Lake to the Gaillard Cut. Since the passage through the cut is narrow, ship speeds are held to six knots. Visibility while passing through the cut is restricted due to the bends in the channel. It is necessary to control traffic through a system of ball and flag hoists mounted on the surrounding hills which operate much the same as semaphores on a railroad. Approaching the Pacific Ocean, ships are lowered 31 feet through the Pedro Miguel Locks to the level of Miraflores Lake. One mile further on, the ship is lowered 53 feet to sea level through the Miraflores Locks. Vessels then follow the channel to Balboa harbor and thence into the Pacific.¹

"Locking-up" is an intricate process requiring an hour for each ship from the time the ship comes to a stop at the approach

FIGURE 2 - CONTEMPORARY CANAL ZONE INSTALLATIONS
SHOWING PROPOSED SEA LEVEL ROUTE



— PRESENT CANAL
 - - - PROPOSED SEA LEVEL CANAL

- 1 GATUN LOCKS
- 2 GATUN LAKE
- 3 GAILLARD CUT
- 4 PEDRO MIGUEL LOCKS
- 5 MIRAFLORES LOCKS

walls of the locks until the last towline is cast off at the opposite end of the lock. Coordination is maintained by the pilot on the ship and the lock master on the walls. Once a ship is in the lock the gates are closed electrically by a lock operator in the lock's control tower. The ship's engines are then secured and the ship is towed through the locks by powerful electric locomotives which move back and forth on a rack and pinion railway. Six locomotives are required for the operation. Two engines in front tow the ship, two in the middle steady it, and the two behind hold it back.² Accidents are a rarity, but locomotives on occasion have been pulled off the walls into the canal through faulty cable handling.

The Third Locks Project. Concern for the vulnerability of the canal to air attack during World War II motivated Congress to authorize \$277 million for the Third Locks Project. The plan envisioned the construction of a third set of locks physically removed from the existing double lock pairs at Gatun, Pedro Miguel, and Miraflores. The size of the new locks was to be 1200 by 140 feet—30 feet wider and 200 feet longer than existing locks. The third locks were to be connected to the existing channel by new by-pass channels.³ Considerable excavation work was accomplished before the project was cancelled in 1942 due to the reduced threat of enemy air attack. The excavation work at Gatun and Miraflores is virtually completed while work on the Pedro Miguel by-pass was never started. Objections have been raised to the sharp bends in the new channels at the Pacific end which are considered by some to be grave navigational hazards. In the interest of expediency the continuance of work on the Third Locks Project would greatly improve navigational facilities in the canal. The plan would not, however, allow for the transit of our modern aircraft carriers or the 106,000 to 135,000 ton commercial bulk carriers now being built.⁴

The Terminal Lakes Plan. Once the canal was operational it became obvious that it contained some basic engineering design errors. The foremost of these was the separation of the two Pacific sets of locks at Pedro Miguel and Miraflores requiring time-consuming double handling of all shipping. To overcome this deficiency the Terminal Lakes Plan was devised in May 1943. The proposal recommended the elimination of the Pedro Miguel locks and their replacement with new and wider continuous step locks at Miraflores.⁵ The level of Miraflores Lake would, as a result, be raised to the level existing in Gaillard Cut and Gatun Lake thus impounding all the waters between the Atlantic and Pacific locks at one continuous level.

The plan would reduce canal transit time by one hour. To date no action has been initiated to implement the Terminal Lakes proposal. This plan, or a combination of the Third Locks and Terminal Lakes Plan, would provide in an economical way substantial improvement to existing canal facilities.

New Sea-Level Route for Old Canal. Proposals for building a sea-level canal at the present canal site antedate construction of the canal itself. During the 1906 controversy over canal construction the Navy Department was the last to concede defeat, never wavering in its support of the sea-level plan vice a lock canal. Proponents of the sea-level route through the Panama Canal have never really abandoned their fight against the locks. Construction of such a sea-level canal would necessitate the deepening and widening of Gaillard Cut and excavation of new channels through the Gatun and Miraflores Lake beds. The tidal range on the Atlantic side of the canal is not more than two feet; however, 40 miles distant the Pacific tide rises and falls from 12 to 16 feet.⁶ Because of this substantial difference in tidal range, a by-pass tidal basin would have to be constructed on the Pacific side for use during periods when strong currents through the canal prohibit safe navigation. Elimination of the locks and use of a sea-level channel would cut transit time in half. The problem of transit by aircraft carriers would also be solved. A sea-level canal through the present Canal Zone would of necessity have to be cleared by conventional excavation—the employment of nuclear blasts being out of the question in such a populated area. This factor makes conventional cost estimates ranging from \$2.8 to \$3.0 billion compare unfavorably with all other routes where nuclear excavation is feasible.⁷ United States diplomats hasten to point out that such a canal, although extremely healthy for Panama's economy, might well remain a political football, subject to the vicissitudes of the governing clique at Panama City.

FOOTNOTES

CHAPTER II

1. Norman J. Padelford, *The Panama Canal in Peace and War* (New York: Macmillan, 1943), p. 84.
2. Andre Siegfried, *Suez and Panama* (London: Jonathan Cape, 1940), p. 315.
3. Miles P. DuVal, "Isthmian Canal Policy—an Evaluation," *United States Naval Institute Proceedings*, March 1955, p. 268.
4. Carl Svarverud, "Sea-Level Canal in Nicaragua Feasible?" *Marine Engineering Log*, February 1962, p. 55.
5. Miles P. DuVal, "Isthmian Canal Policy—an Evaluation," p. 269.
6. Rachel L. Carson, *The Sea Around Us* (London: Staples Press, 1957), p. 50.
7. "Will a New 'Big Ditch' Be Built?" *Business Week*, 15 February 1964, p. 47.

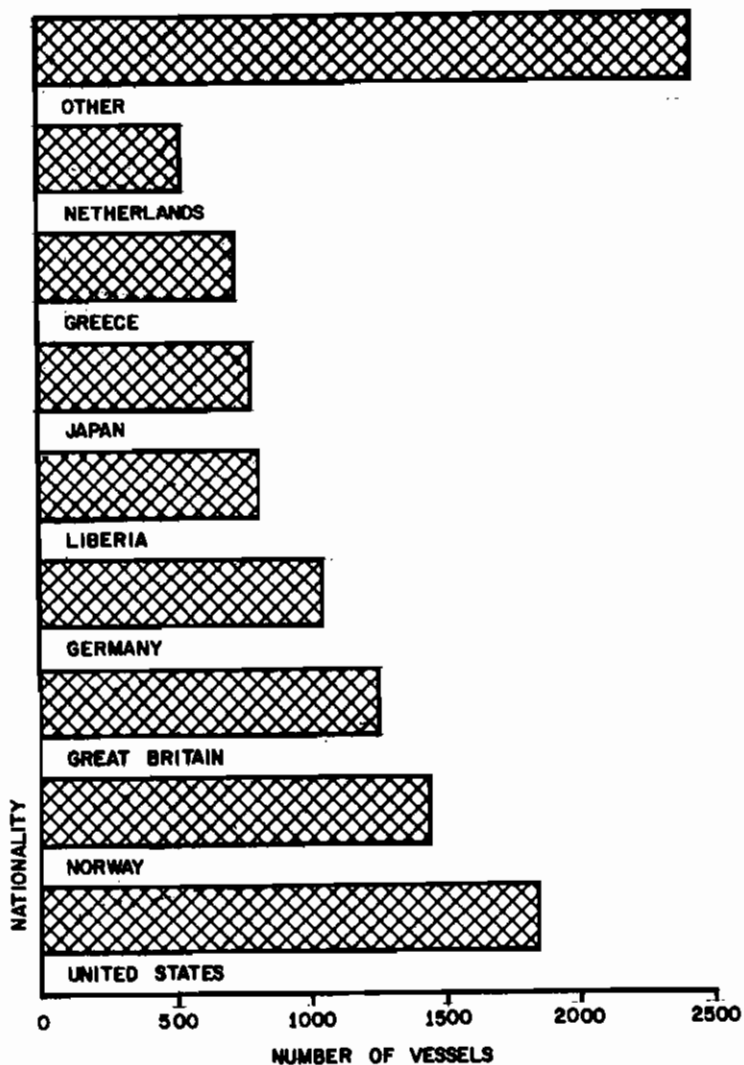
CHAPTER III

BASIC CONSIDERATIONS FOR ROUTE SELECTION

Thorough investigation, many surveys, and careful weighing of all available evidence will have to take place before an actual canal site can be chosen. The final choice of one site over all others will reflect a composite of many advantages, and not merely the lowest excavation cost alone. Economics of construction are important, but other factors must be considered. There are physical and geographical factors, defense considerations, and mileage savings to shippers to be weighed. Legal and political considerations loom large. They could easily present greater obstacles than the actual construction of the canal itself. A treaty will have to be negotiated with the country through whose territory the canal would pass. The question of radioactive fallout has arisen in connection with nuclear construction. Until sufficient lucubration has been given these areas, the United States cannot wisely select the route which would hold forth the greatest prospect for success.

Economic Considerations. The economic importance of the present Panama Canal is incalculable. Directly or indirectly, all the nations of the world benefit from the canal. The principal beneficiary is the United States. Of all commerce passing through the canal, 60 percent either originates in, or is destined to, the United States.¹ In seeming contradiction to this is the fact that only 22 percent of all ships transiting the canal are under United States flag. This low figure is explained in part by the volume of United States shipping registered under the so-called flags of convenience of Panama, Honduras, and Liberia. The United States is still the leader in the number of vessels using the canal, followed by Norway, Great Britain, Germany, Liberia, and Japan. (See Figure 3) In commenting before the Committee on Foreign Affairs in 1960, Admiral James S. Russell, in discussing the importance of the Panama Canal, pointed out that the United States imports by sea 66 of the 77 strategic raw materials required in time of war.² For example, ten percent of the United States' requirements of zinc move through the canal from Peru. One ton of zinc shipped through the canal from Peru to an East Coast port costs \$18 per ton and requires 11 days in transit in contrast to \$48 per ton and 33 days shipping time if required to be moved around South America. Other strategic materials shipped from the west coast of South America through the canal include antimony, bauxite,

Figure 3 - COMMERCIAL VESSELS TRANSITING THE PANAMA CANAL IN 1962

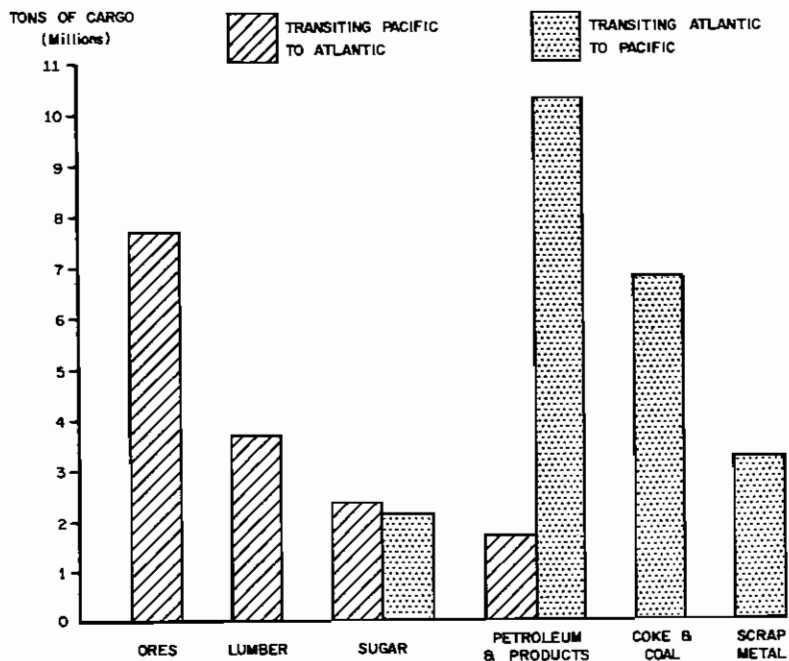


Source: *Britannica Book of the Year, 1963*, text, p. 631.

manganese, vanadium, copper, tungsten, and tin.³ In addition to ores; crude and refined petroleum products, coal, lumber, sugar, and scrap metal account for the overwhelming bulk of canal commerce. (See Figure 4) At one time the bulk of trade flowing through the canal was intercoastal shipping. As late as 1922 intercoastal shipping accounted for 50 percent of total canal traffic. Today this figure has fallen to 14 percent. This drop in intercoastal shipping makes the proximity of Mexico's Tehuantepec route to both coasts of the United States a less decisive factor. The largest single element in canal traffic today is the United States-Japan trade which accounts for 16 percent of the total, followed closely by the West Coast of South America-United States East Coast trade representing 11 percent.⁴ Looking at the canal from the perspective of Japan and South America we find that over 50 percent of Japanese exports pass through the canal while the nations of South America depend on it for between 75 percent to 90 percent of their total imports and exports.⁵ In defending the canal in hearings on United States relations with Panama, the Honorable Roy R. Rubottom, Assistant Secretary of State for Inter-American Affairs, said, "I think commercial traffic alone as this social and economic revolution in Latin America continues and trade opens up further between all countries of the Americas . . . will continue to justify the canal."⁶ The Free World has been compared to a big island, dependent upon its imports and the merchant shipping to deliver them. The question remains, "Do we have enough merchant bottoms and free access to the source of strategic materials to win a future war?"⁷ Without a new sea-level canal the answer would certainly be "no."

It is recognized by our new sea-level canal planners that construction of such a canal will have a profound effect on Panama's present economy. Serious economic dislocations, unemployment, and other problems will arise unless the Panamanian economy is better prepared to absorb the shock of adjustments resulting from relocation of the present canal. The problem must be examined from a number of perspectives, depending on whether or not the new canal is built across Panama or some other site and whether or not the old Panama Canal is continued in use. Regardless of the new sea-level canal's location it is doubted that it would be economically feasible to continue the old canal in operation after the sea-level route were opened to navigation. There is some possibility of building a case for continuance, however, if the new route were built a significant distance away—in Mexico, for instance. Present plans call for renegotiating the 1903 canal

Figure 4 - PANAMA CANAL CARGO BY MAJOR COMMODITIES
FY 1962



Source: *Britannica Book of the Year*, 1963, text p. 631.

treaty with Panama at the same time that the sea-level canal treaty is entered into.* It may well develop that the present Panama Canal will revert to full Panamanian sovereignty; in which case, the financial ability of the Panamanian government to operate and maintain the old canal at a profit comes into the picture. The Honorable Thomas C. Mann stated in hearings before the Senate Commerce Committee that operation of both the new and old canals would depend in the last analysis on the economics of the situation, and that possibly, traffic requirements would require both.⁸ Other observers are not so optimistic, pointing out that a sea-level canal constructed in another country many miles distant from the present site would be disastrous for Panama's economy. A new sea-level route capable of handling up to 200 ships a day would eclipse the present operation overnight. The old canal would have to be abandoned. One official has suggested that the present canal could be converted into a source of hydroelectric power for Panama at small cost.⁹ Even if another route within Panama were chosen for the sea-level route, serious disruption to her economy would occur. Panama's two largest cities, Panama City and Colon, have grown up adjacent to the Canal Zone. These two cities contain 25 percent of Panama's population and being wholly dependent upon the present canal operation, might entirely wither away.

* [Ed. Note: Since the writing of this paper, the President of the United States has announced that a new Panama Canal Treaty was under negotiation. The areas of agreement reached to date are:

1. The 1903 Treaty will be abrogated.
2. The new treaty will recognize Panama's sovereignty over the area of the Canal Zone.
3. The new treaty will be terminated after a specified number of years, or on or about the date of the opening of the sea-level canal, whichever occurs first.
4. The new treaty will provide for the political, economic, and social integration of the area used in the canal operation with the rest of the Republic of Panama.
5. The new treaty will provide for the defense of the existing canal and any sea-level canal which may be constructed in Panama.
6. The new treaty provides that the present canal and any new canal which may be constructed in the future shall be open at all times to the vessels of all nations on a nondiscriminatory basis.

For the full text see the President's statement of 24 September 1965 on the Panama Canal Treaty Negotiations.]

Panama's biggest employer is the Panama Canal Company which counts 11,000 Panamanians on its payroll.¹⁰ These men account for an annual income of \$45 million. The total work force now employed on the Panama Canal, including Americans, is 14,000. Because of its lack of intricate machinery and its ease of navigation, a sea-level canal would need only a small fraction of the present work force for its upkeep. Estimates run as low as 600 men with only a fraction of this number actually required at the site.¹¹ As a result, thousands of Panamanians would be jobless unless other industries could be developed to absorb these skilled workers.

The Honorable Leonor K. Sullivan, chairman of the subcommittee on the Panama Canal within the Committee on Merchant Marine and Fisheries, made an interesting observation when discussing Panama Canal problems in 1963. Mrs. Sullivan stressed that the United States must help raise Panama's living standards so that the canal no longer stands as the symbol and sole means by which Panamanians could hope to live decently.¹² To the impoverished peoples of Panama the canal, with its double standard of living, has always stood out as an oasis in their midst. To the "have-nots," the Canal Zone seems to have everything—jobs for all, good housing, inexpensive utilities, stores offering an abundance of inexpensive merchandise, and free education. Since the United States directly or indirectly is responsible for the bulk of Panama's income and gross national product, we have a moral obligation to uphold the Panamanian economy, particularly if the new canal is built elsewhere. Even if the sea-level canal were built on Panamanian soil, the United States must find ways to help Panama to industrialize and in other ways increase their revenues and, at the same time, decrease their dependence on the Canal Zone. It is also incumbent upon the United States to avoid any stigma of punitive action or abandonment of Panama when negotiating for the future sea-level site. Despite Panamanian uprisings in the past we must help Panama move into a better economic climate regardless of where the new canal is built. This we must do to uphold our American image of fair play before a world audience of underdeveloped nations. Panama stands representative of all Latin America. What we do in Panama will have a profound effect on the rest of Central and South America.

Latin America has the highest rate of population growth in the world today. Its population is expected to reach 375 million by 1975 and 624 million by the year 2000.¹³ Panama's population

alone has grown by 32 percent in the past ten years; and in Panama, life expectancy is higher than in any other Latin American country.¹⁴ Accounting for one-sixth of the land surface of the globe and only seven percent of the world's total population, Latin America still counts 130 million hungry citizens. She has suffered from an adverse trade balance since 1937. Even so, per capita income has increased by 60 percent since 1930. In citing these statistics Admiral B. L. Austin, Chairman of the Inter-American Defense Board, stated that another canal undoubtedly would enhance the future development of all Latin America.¹⁵

With our help, our neighbors to the south are making progress in improving their economic climate. The Alliance for Progress represents a start in the right direction toward improving economic and social conditions in Central America. Panama has received millions of dollars in direct grants of aid, Point Four Program technical assistance, and substantial loans from the Inter-American Development Bank.¹⁶ In 1962, the last year for which complete figures have been tabulated, the government of Panama received a total of \$84.4 million¹⁷ income from all canal-connected sources, an amount equivalent to one-fourth of her gross national product.¹⁸ In addition to this direct economic support, Panama has benefited from the proximity of the United States' presence in the Canal Zone in many ways. Benefits include a safe, pure water system; freight subsidy rights, including free carriage of Panamanian mail on the Panama Railroad; hospitals, schools, and many additional AID-type programs carried out by members of our armed forces. Panama, having no deep-water piers of her own, is dependent upon Canal Zone port and harbor facilities for her export-import trade.¹⁹ It is not difficult to visualize the chaos that sudden termination of these programs would engender. What is needed most drastically is a firm resolve on the part of Panamanians to broaden their economic base.

In the past this base has been too narrow. In addition to Canal Zone operations the two remaining prime sources of revenue have been the United Fruit Company and Panama's merchant marine. The United Fruit Company has developed a substantial banana industry, marketing its Panamanian grown bananas under the famous "Chiquita" brand. Recent labor troubles and prolonged wind and rain storms in Bocas del Toro and Chiriqui provinces have cut deeply into wages. Panama has recently undergone an economic crisis which decimated her once powerful merchant marine. For years ship owners

had avoided high operating costs and taxes by placing their vessels under Panama's flag. This was made possible because these charges were lower under the flag of Panama. Wages and working-condition standards were substantially lower under Panamanian law. This eventually caused the merchant sailors working on flag of convenience ships to seek remedial action. The International Transport Workers Federation took up their grievances and fostered a world-wide boycott of Panamanian registered ships.²⁰ As a result Panama's merchant marine, once numbering over 800 ships, has been seriously curtailed through shifts in registry with a resultant loss of tax revenue further depressing the economy. Panama's merchant marine did not recoup its World War II losses, new construction in postwar years being placed principally under the Liberian flag. Liberia's merchant fleet, virtually nonexistent prior to 1946, now numbers 900 ships while Panamanian flag vessels number fewer than 600. Other segments of Panama's economy, now minor in nature, which are capable of expansion are the cultivation of oranges, coffee, cocoa, sugar cane, and tobacco; gold mining; timber; and fishing. Panama is relatively rich in natural resources, some of which have never been exploited. This is primarily due to lack of financing, organization, and an incentive to develop them.

In 1952 the five Central American countries, including Panama, undertook a program to promote close integration of their economies based on free trade, industrial specialization, and coordination of economic development.²¹ These countries have two things in common. They all have similar economic backgrounds and all recognize the cold fact that none of them alone possess the capacity to effect the changes necessary to raise their standard of living substantially. In a speech delivered before the Industrial College of the Armed Forces, Professor Kalman H. Silvert, an acknowledged expert on Latin America, cited El Salvador and Panama as the two Central American republics closest to economic transition.²² An agreement to form a Common Market for Central America was signed in 1960 by El Salvador, Guatemala, Honduras, and Nicaragua, with Costa Rica subsequently joining.²³ To date, Panama has shown little interest in the proposal. In essence, the scheme calls for an equitable distribution of new industrial plants among member countries and elimination of tariff walls to facilitate trade among themselves. To accomplish this lofty goal, machinery would have to be set up which would be responsive to a multinational agency.

A decision to place the new canal outside of Panama would be ruinous to Panama's economy. Even if the canal were to be built across the Isthmus of Panama, serious disruption of the economy would result. In either case the new sea-level canal will mean for Panama a reduced economic posture necessitating increased United States' help. On the other hand, should the canal be built through Mexico, Nicaragua, Costa Rica, or Colombia, these countries, never having been dependent on canal income, could only benefit from such operations in a positive way. A sea-level canal through Nicaragua-Costa Rica would act as adrenalin on the economic health of these nations. Nicaragua and Costa Rica both contribute less than one percent to the total value of all Latin American exports. Their respective gold, coffee, lumber, banana, and livestock exports, approximate \$80 million annually, an average export income which is substantially above Panama's. Even so, per capita incomes in Costa Rica and Nicaragua are significantly lower than those in neighboring Panama—a fact which points to the existing canal's impact on Panamanian employment. Mexico and Colombia are comparatively better off. Colombia accounts for five percent of total Latin American exports while Mexico boasts eight percent. Coffee has long been the money maker in Colombia although diversification in recent years has broadened her economic base. The products of Mexico's mines—gold, silver, lead, zinc, copper, and antimony—together with cotton and hemp have been the mainstays of her economy.²⁴ Sea-level canal revenue would not have the impact on either Mexico or Colombia that would be felt in Nicaragua and Costa Rica.

Political Considerations. Since it has been estimated a new sea-level canal would take from 10 to 15 years to complete, we must first renegotiate the old Panama Canal treaty. Detailed preliminary surveys alone will require three years at a cost of \$17.5 million.²⁵ Our intention to amend the 1903 treaty as announced by President Johnson on 18 December 1964 brought forth a rare moment of praise from Panama and Latin America. President Robles of Panama hailed President Johnson's statement as an "historic day full of happy prospects" for his country.²⁶ The new treaty for the existing Panama Canal would be in effect until the new sea-level canal is opened and, by eliminating the age-old source of irritation to Panamanians, should set the stage for an improved disposition toward the United States. Once the new canal is open to navigation the Canal Zone should revert to Panamanian sovereignty. But what

use would an old canal be to Panama? The new canal, being faster, would attract most shipping and it is doubtful that Panama could operate and maintain the complex Panama Canal with its own resources. If the old canal were to remain operational, the United States would certainly have to retain a hand in its maintenance despite Panamanian sovereignty.

One thing is certain. In negotiating for a treaty governing the sea-level canal the United States will never again be able to exercise sovereignty over territory surrounding the canal. Latin blood boils at the thought of being subjected to the "indignities" to sovereignty suffered by Panama. None of the republics would grant the United States exclusive control and virtual sovereignty over their territory as Panama did in 1903. Even Nicaragua, upon hearing President Johnson's announcement, hastened to renounce the 1914 Bryan-Chamorro treaty which gave the United States the right to lease lands for a canal.²⁷ Nicaragua, like all other Central American republics, would welcome the sea-level canal, but only on her own terms. The new canal treaty must be negotiated with the chosen government on terms acceptable to both the United States and the local government. This could prove a bigger obstacle than building the canal itself. Thorny questions as to ownership, canal operations, and tolls will have to be resolved. The United States can afford to be magnanimous in bargaining for terms. We must, however, stand firm on three points. The canal must remain open to the navigation of vessels of all nations. The United States must retain the right of passage for its naval forces at all times free from all interference, political or otherwise. Lastly, we must reserve unto ourselves the right to defend the canal against attack.

In many ways a sea-level canal would differ from the present canal. A sea-level canal would not present the major security problems inherent in the present lock-type canal. With the security problem removed, there would be no need for a buffer zone around the canal as exists in the Canal Zone. It would require only a fraction of the present canal's complement of personnel to operate and administer it.²⁸ A sizeable reduction in the number of American canal employees would help reduce political friction. The new canal would be more modern, more economical to maintain, and easier to defend.

Any interruption of the harmonious relations currently existing between the United States and Panama would have a deleterious effect upon present canal operations and could well endanger

future canal negotiations. It is important, therefore, to understand what kind of government faces us in Panama. President Marco Robles was inaugurated in October 1964. He is very popular with the army and commands the backing of two thirds of the members of the National Assembly.²⁹ He has a reputation for honesty and determination, is an avowed anticommunist, and in the past has dealt roughly with communist agitators. He has expressed confidence in the United States on many occasions. The amelioration of Panama-United States relations has already manifested itself under his regime. Since taking office he has launched programs to set government finances in order, to reform the tax structure, to cut back on government payrolls, to stimulate agriculture, and to stabilize the economy.³⁰ All this has been done despite the interests of the powerful commercial ruling class who historically have opposed chief executives who tamper with the *status quo*. Ironically this same clique was instrumental in putting Robles in office. This group constitutes his biggest worry. Nevertheless, President Robles appears to be Panama's best hope for future peaceful development.

It is always possible that the government of the country through whose territory we wish to build the canal will choose to "go it alone." This situation has already been attributed to Mexico. The Mexican press has quoted its Foreign Minister as saying that Mexico prefers to construct a canal with its own funds at a later date, and is therefore not interested in negotiations with the United States at this time.³¹ Panama's Foreign Minister, Fernando Eleta, has been quoted as hinting of such a move by Panama.³² Borrowing from the World Bank would be contingent upon nuclear construction since Panama would be in no position to bear the expense of the estimated five to six billion dollars for conventional excavation. (See Table I) It is more probable, however, that Eleta's stand was designed solely for the purpose of strengthening Panama's hand at a future bargaining table. Such a move could easily be countered by the United States by increased interest in either Colombia or Nicaragua.

Strategic Considerations. The strategic importance of the present canal has diminished over past years. Today the canal lies defenseless, its anti-aircraft batteries and fighter aircraft having been removed. In fact the present canal is indefensible against an all-out attack by ICBM's.³³ Today's defense is vested in the retaliatory might of continental United States bases. The Panama Canal's strategic value in a limited war situation, such as Korea or Lebanon, cannot be overlooked.

TABLE I
 STATISTICAL COMPARISON OF ALTERNATE ROUTES

ROUTE	LENGTH IN MILES	MAXIMUM ELEVATION AT CONTINENTAL DIVIDE (FEET)	COST ESTIMATE, CONVENTIONAL EXCAVATION (BILLIONS)	COST ESTIMATE, NUCLEAR EXCAVATION (BILLIONS)	SUITABILITY FOR NUCLEAR BLASTING
TEHUANTEPEC ROUTE (MEXICO)	125	872	\$13.0	\$2.3	NO
NICARAGUA-COSTA RICA BORDER ROUTE	140	760	4.1	1.9	YES
SAN BLAS GULF ROUTE	37	1100	6.2	.62	NO
CALEDONIA BAY ROUTE	62	1100	5.13	.77	YES
ATRATO-TRUANDO ROUTE (COLOMBIA)	95	932	5.26	1.2	YES

Source: *The New Republic*, 28 March 1964, Table, p. 23 (adjusted).

During the Korean conflict Military Sea Transport Service ships moved 54 million tons of cargo and 22 million tons of petroleum products through the canal. This was the equivalent of 64 pounds of material per day for every American fighting man. Admiral Russell, testifying before the House Committee on Foreign Affairs, explained that if the canal were used, it would take eight days to reinforce the United States' Pacific antisubmarine forces against a Russian submarine threat, but 21 days otherwise.³⁴ During the same hearings Major General William E. Potter, Governor of the Canal Zone, pointed out the role the canal plays in moving supply ships where they are needed. If the canal can be depended upon, each warship becomes more valuable in our planning.³⁵ Our military reliance upon the canal was last demonstrated in 1962 when we quickly moved key amphibious units from California to Cuban waters. Our proposed 1000-foot-wide sea-level canal would, of course, offer no obstacle to the passage of our largest warships. A sea-level canal should prove infinitely less vulnerable to nuclear attack, while the lock canal could receive damage beyond repair.

The sea-level canal should be built without organic defenses. In war our forces could easily occupy and control the area contiguous to the canal. Care should be exercised when drafting the new canal treaty to transcribe this right into law and thus avoid the plight of the British in Suez. Despite our two ocean navy and despite a canal without defenses, our operational planning must guard against surprise attack; for, if the Russians ever gained control of the world's sea straits, they could strangle the United States just as surely as if they attacked our mainland itself. The dynamic concept which led to the building of the canal in the first place was naval strategy.³⁶ Today this fact is still paramount although no one would dispute the canal's importance to both intercoastal and worldwide commerce. Lying as it does across the isthmian land bridge, the canal dominates a position of military strength and access to resources.

Technological Considerations. The feasibility of employing nuclear excavation techniques in canal construction is no longer questionable. A nuclear constructed canal could be completed in one fifth the time required by conventional means. In current estimates, nuclear construction costs are less expensive by a factor of four over conventional means.³⁷ This is made possible because of the tremendous and relatively inexpensive energy released in nuclear explosions. As improvements in technique are perfected it is anticipated that costs will drop even further.

The Atomic Energy Commission in its Plowshare program has developed nuclear explosives for peaceful applications which produce the least possible amount of radioactivity.³⁸

The ever-present question of safety arises when considering the use of nuclear excavation. The intense heat created by a nuclear explosion lines the crater with molten rock which in turn quickly solidifies, trapping 90 percent of the lethal radiation underground. A small amount of radioactive material becomes airborne and is deposited nearby. The Atomic Energy Commission has concluded that radioactivity need not constitute a hazard and that exposure can be held to safe levels. To date, considerable progress has been made in the development of "clean" explosives utilizing only a small amount of fissionable material. With continuing advances in technology it is possible that the megaton yield from underground blasting will be sharply curtailed, resulting in a drastic reduction in radioactivity. Dr. Glenn Seaborg, Chairman of the Atomic Energy Commission, when questioned on this point by the Senate Commerce Committee stated, "We do this in two ways; one, by developing nuclear explosives with smaller and smaller amounts of this radioactive fallout; and, secondly, by trying to better our techniques for containing radioactivity produced by a given explosive underground or in the immediate neighborhood." ³⁹

The first step in preparation for nuclear construction on any site would be a survey to determine the subsurface geology of the site. The detailed turns of the sea-level route are more likely to follow the advantageous features offered by the geology of the subsurface rather than what appears on the surface. Once core drillings are made and the rock formation is known, a proper cratering technique for future blasting can be developed with this knowledge in mind. The feasibility of cratering has successfully been demonstrated in Project Sedan. In 1962, during this first major excavation experiment held at the Nevada test site, a 100-kiloton device was detonated 635 feet underground creating a crater 1280 feet wide and 320 feet deep.⁴⁰ Once a site has been selected and the geology of the area is known, the Atomic Energy Commission plans to build nuclear devices tailored to the specific site requirements since suitable explosives are not now in our stockpile.⁴¹ Another consideration affecting possible route selection is density of population. For this reason several sites are not suited to nuclear exploitation. Of the remaining sites, varying numbers of inhabitants would have to be evacuated while construction were in progress.

The restrictions upon nuclear excavation, under the terms of the Nuclear Test Ban Treaty, raise another issue. Dr. Seaborg has advised Congress that modification of the existing treaty may be needed before construction could commence.⁴² The treaty now bans explosions that would generate radioactive debris across international boundaries. Modification would require agreement by the Soviet Union, a signatory to the treaty. Since it is known that Soviet engineers have their own plans for peaceful application of nuclear devices, whether or not they would exercise their veto right is problematic. Dr. Seaborg; in noting the interest of Russia, France, Israel, India, and others in global cooperation concerning peaceful use of the atom was optimistic enough to say, "We probably should begin to give serious consideration to some kind of international cooperation in Plowshare. This could either be in connection with the International Atomic Energy Agency or other appropriate groups." ⁴³ It may well prove that international boundaries will not be a question if megaton yields and corresponding fallout can be reduced as anticipated. In any event, time is in our favor since the diplomats have five to ten years to work on treaty revision. It will take at least that long to complete surveys, develop excavation technology, and produce the required nuclear explosives.⁴⁴

FOOTNOTES

CHAPTER III

1. House Committee on Foreign Affairs, p. 41.
2. *Ibid.*, p. 94.
3. "America's Troubled Canal," *Fortune*, February 1957, p. 167.
4. *Ibid.*, p. 168.
5. "Dig We Must," *Time*, 25 December 1964, p. 16.
6. House Committee on Foreign Affairs, p. 73.
7. Clifton R. Largess, "Japan and Germany—Why Sea Power Failed," Lecture, U.S. Naval War College, Newport, R.I.: 2 February 1965.
8. U.S. Congress, Senate, Committee on Commerce, *Second Transisthmian Canal*, Hearings (Washington: U.S. Govt. Print. Off., 1964), p. 16.
9. "Another 'Panama Canal': A-Blasts May Do the Job," p. 75.
10. Senate Commerce Committee, p. 68.
11. *Ibid.*, p. 12.
12. U.S. Congress, House, *Panama Canal Problems*, Hearings (Washington: U.S. Govt. Print. Off., 1963), p. 29.
13. Bernard L. Austin, "The Strategic Significance of Latin America," Lecture, U.S. Naval War College, Newport, R.I.: 23 November 1964.
14. Gereon Zimmermann, "The Threat to the Panama Canal," *Look*, 1 August 1961, p. 67.
15. Austin, lecture.
16. August C. Miller, "Prognosis for the Panama Canal," *United States Naval Institute Proceedings*, March 1964, p. 68.

17. This figure includes canal rent (\$1.9 million), purchases of goods by government and private organizations, contractor's purchases, and the expenditures of United States citizens employed in the Canal Zone.

18. Miller, p. 72.

19. Senate Commerce Committee, p. 68.

20. Lawrence O. Ealy, *The Republic of Panama in World Affairs* (Philadelphia: University of Pennsylvania Press, 1951), p. 180.

21. Victor L. Urquidi, *The Challenge of Development in Latin America* (New York: Praeger, 1964), p. 130.

22. Kalman H. Silvert, *Latin America: the Economic and Political Climate*, L63-150 (Washington: U.S. Industrial College of the Armed Forces, 1 April 1963), p. 9.

23. Urquidi, p. 130.

24. Preston E. James, *Latin America* (New York: Odyssey Press, 1950), p. 638.

25. Senate Commerce Committee, p. 8.

26. "Historic Day Applauded by Panama Chief," *The Providence* (Rhode Island) *Journal*, 19 December 1964, p. 12.

27. "New Canal Issue for El Salvador," *The New York Times*, 10 January 1965, p. 29.

28. Senate Commerce Committee, p. 10.

29. "New Riots in Panama?" *The New Republic*, 28 November 1964, p. 10.

30. Olive Brooks, "Canal Zone Is Watchful on U.S. Plans," *The New York Times*, 22 January 1965, p. 56.

31. Senate Commerce Committee, p. 17.

32. "Panama Considers Building Isthmian Sea-Level Canal," *Newport* (Rhode Island) *Daily News*, 3 February 1965, p. 15.

33. Miller, p. 70.
34. House Committee on Foreign Affairs, p. 94.
35. *Ibid.*, p. 46.
36. R.S. Fahle, "The Panama Canal--an Auxiliary of the Fleet," *United States Naval Institute Proceedings*, May 1954, p. 496.
37. Finney, p. 21.
38. Senate Commerce Committee, p. 26.
39. *Ibid.*, p. 30.
40. Finney, p. 22.
41. Senate Commerce Committee, p. 30.
42. *Ibid.*, p. 33.
43. "Problems in Digging a Canal with Nuclear Blasts," *The Providence (Rhode Island) Journal*, 8 January 1965, p. 28.
44. Finney, p. 24.

CHAPTER IV

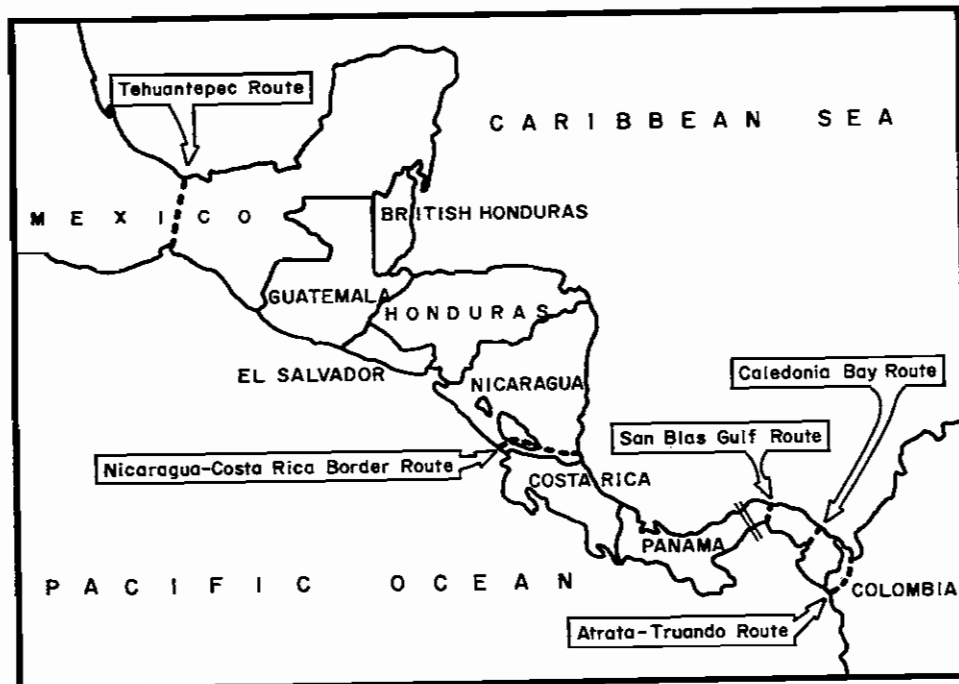
ALTERNATE ROUTES FOR NEW SEA-LEVEL CANAL

Alternate sites for the building of an entirely new sea-level canal have been explored from time to time in past years, due primarily to the political instability within Panama. On 6 July 1962 Senator Warren G. Magnuson, Chairman of the Senate Commerce Committee, introduced a bill authorizing preliminary surveys of possible sites.¹ These preliminary surveys have now been completed. On 3 March 1964 Senator Magnuson introduced Senate bill S.2497 which provides for an investigation and study to determine an actual site for construction of a sea-level canal through the American isthmus. The bill calls upon the Secretary of State, the Secretary of Defense, and the Atomic Energy Commission, to act together in considering matters of national defense, foreign relations, intercoastal shipping, interoceanic shipping, and other matters deemed to be important when selecting the canal site.² Plans now call for nuclear construction of an unrestricted sea-level waterway 1000 feet wide and 250 feet deep designed to handle up to 200 ships a day. Altogether a total of 30 different transisthmian routes have been proposed at one time or another.³ Of these, five principal arteries have emerged as the most likely of accomplishment. (See Figure 5)

Mexico's Tehuantepec Route. If President Johnson's announcement of 18 December 1964 is to be taken seriously, the Tehuantepec route for the new sea-level canal has already lost out to its four rivals.⁴ One must not be too hasty in dismissing this possibility, however, as it has much to commend it. Mexico possesses the manpower and skills required for canal construction and operation. Her political stability lends itself to successful peaceful operation of the canal, free from communist agitation and intrigue. Mexicans in general are enthusiastic about building their own Tehuantepec Canal. They are equally insistent upon national control, yet they lack sufficient capital to tackle the estimated \$2¼ billion building job without outside financial assistance. Upon Mexican application such financial assistance might be forthcoming from the World Bank for Reconstruction and Development.

The chief objections to the Tehuantepec route are that it is too long and mountainous. However, the summit at the Continental Divide is 872 feet compared to elevations of 1100 feet in Panama.⁵

FIGURE 5 - ALTERNATE SEA LEVEL CANAL SITES



Only 22 miles of the route lie above the 400 foot elevation. The route, 125 miles in length, is not the longest, being exceeded by the 140 mile Nicaragua-Costa Rica route. Colombia's Atrato-Truando route, at 95 miles, runs a close third. (See Table 1, page 28) On the average, ships using the Mexican route rather than the Panama Canal would add nine hours to their sailing time; however, this is offset by a savings of 60 hours per trip for the inter-coastal operator.⁶ In an engineering sense, construction appears entirely feasible especially if nuclear construction techniques could be employed. Nuclear excavation would bring construction costs in line with other routes under consideration. However, serious doubts exist as to the feasibility of employing nuclear devices because of six towns situated in the region with populations of approximately 55,000.⁷ The Tehuantepec route would be expensive to construct, may not be open to negotiation with the Mexican government, yet would provide the maximum speed and economy to intercoastal commerce and naval redeployment.

Nicaragua-Costa Rica Border Route. It was only by last-minute political maneuvering that the canal wasn't built in Nicaragua in the first place. Public opinion had been in favor of this route ever since the 1896 Republican National Convention at Philadelphia had advocated a Nicaraguan canal in their platform.⁸ By 1899 negotiations were under way to prepare treaties with Nicaragua and Costa Rica to settle construction details and the matter of ownership and control. However, Bunau-Varilla's activities were destined to upset these plans. It was not until 1947, when Panama forced the United States to abandon its defense bases adjacent to the Canal Zone, that attention reverted to Nicaragua as an alternate site. The Nicaragua route has never really died but has lain dormant over the years always presenting an alternate possibility to Panama.

Present plans for a Nicaraguan canal call for either one of two possible approaches to construction. The first of these involves utilization of the existing San Juan River and Lake Nicaragua for the majority of the route. Since a sea-level canal would drain elevated Lake Nicaragua, and since much of Nicaragua's population and industry is located adjacent to the lake, it is generally felt that such a step would seriously disrupt the country's economy.⁹ An alternate scheme has been advanced that would make drainage of Lake Nicaragua unnecessary. The plan calls for construction of the sea-level canal in a straight line through the narrowest part of the isthmus in the area. The line would run a length of 130 miles due east and west on latitude 11°03' north from Salinas Bay on the Pacific to a point ten miles north of

Greytown on the Atlantic side.¹⁰ This line runs alternately through the Nicaragua-Costa Rica border, and since it passes south of Lake Nicaragua, drainage would become unnecessary. Some flexibility in the straight line would be allowed in order to avoid high elevations. Maximum elevation at the divide is 760 feet, and only six miles of the route exceed a 400 foot elevation. Another advantage lies in the fact that tidal locks would not be required as at Panama since maximum tidal variations are five feet contrasted to 16 feet at Panama. Sea-level navigation would be safer and delays, incident to strong currents, eliminated.¹¹ The Nicaragua-Costa Rica Border Route appears well suited to either conventional or nuclear excavation. The cost of a nuclear built canal is estimated to be \$1.9 billion, approximately half that of conventional methods. In any event treaties with both countries would be involved, a factor that carries a certain appeal to those opposed to unilateral or even bilateral canal operation. If our second canal is to be built with conventional means, this route seems to offer the greatest advantages.

San Blas Gulf Route. The track across the isthmus of Panama at San Blas is by far the shortest of the proposed canal routes. It is but 37 miles from coast to coast with a maximum elevation of 1100 feet at the divide with a total of seven miles lying above the 400 foot level.¹² The San Blas Gulf route is one of two possible sea-level sites situated in Panama between the present canal and the Colombian border. The route would utilize a river bed halfway across the isthmus. In 1960 the Panama Canal Company estimated, in their Isthmian Canal Plan, the cost of construction using nuclear excavation to approximate \$620 million.¹³ The big drawback to the San Blas Gulf route stems from its proximity to heavily populated areas making nuclear construction extremely hazardous if not altogether impossible.¹⁴

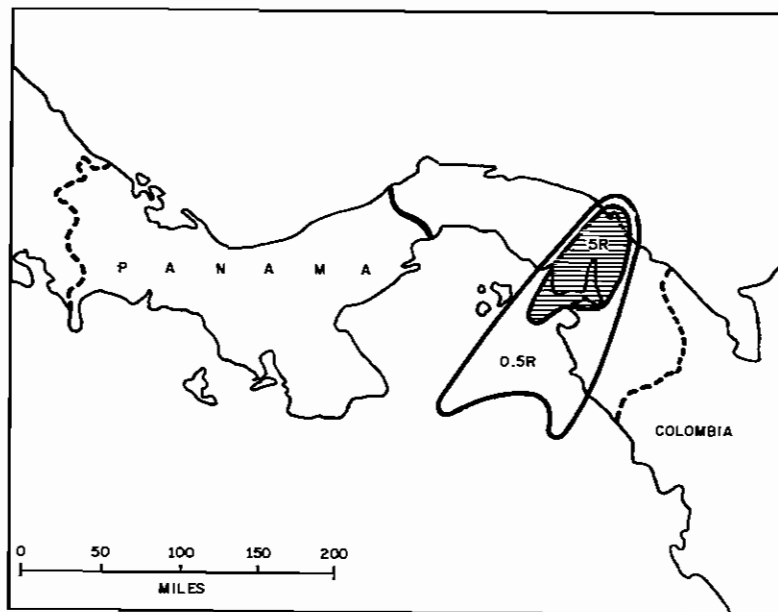
Caledonia Bay Route. This route, often referred to as the Sasardi-Morti route, lies 110 miles east of the present canal. The route extends 62 miles from Caledonia Bay on the Atlantic side, partially following the course of the Sabana River to the Gulf of San Miguel on the Pacific. As at the San Blas site, a 1100 foot elevation is encountered at the intersection of the canal line and the Continental Divide. The route passes through primeval jungle sparsely populated with primitive Darien Indians. Only four towns lie within 25 miles of the site, the largest having a population of 1703.¹⁵ This site is considered well suited to nuclear blasting. To blast a channel across the isthmus at Caledonia Bay, Atomic Energy Commission engineers anticipate working from both coasts toward the center. After borings to sample rock formations are

made, holes would be drilled approximately 800 feet apart to a depth of between 650 and 2600 feet. The holes would then be lined with thick steel casings. It is estimated that a maximum of 4000 men would be required to complete the job in two and a half years. In practice it has been demonstrated that the earth and rocks to be excavated by nuclear underground demolition are broken up, and being ejected, form a huge crater. Actual nuclear blasting would require relatively little time. After placement in the drilled holes, the nuclear charges would be detonated in strings of 15 charges to a section thus forming a continuous smooth trench. Nuclear blasting would follow on behind as new holes were drilled inland. The Caledonia Bay route would require no more than 325 nuclear blasts of varying yield for completion.¹⁶ Additional conventional work would be required to dredge approach channels to the canal on both the Atlantic and Pacific sides. Mosquito control to combat yellow fever and malaria, reminiscent of Panama Canal construction days, would be needed to protect demolition crews.

In 1960, when the Panama Canal Company made their first site surveys, plans called for the detonation of 325 nuclear devices containing a yield of 300 megatons to dig the Caledonia Bay canal. Due to advances in technology it is now held that this job could be done today with 310 blasts bearing a total yield of 170 megatons.¹⁷ By the time actual construction commences additional technological advances should bring the yield down even further. In a statement made by Dr. Gerald Johnson, Associate Director for Plowshare, it was revealed that the radioactivity now expected in the fallout pattern is about one one-hundredth of that predicted in 1960.¹⁸ The fallout expected along the Caledonia Bay route would not exceed five roentgen.¹⁹ (See Figure 6) Ten roentgens corresponds to the average radiation dose a person receives from natural sources in a lifetime. The 0.5 roentgen value is equivalent to exposure acquired in less than five years from the earth's natural radiation. In order to receive a five roentgen exposure a person would have to be caught in the fallout and remain there. The prevailing winds in the area are generally southwest. Blasting would be done at a time when the wind pattern would carry the nuclear debris out over the Pacific Ocean. Sufficient radioactive decay will have taken place to allow persons evacuated from the area during construction to be returned to the area within the year in which the operations terminated.²⁰

Fewer obstacles to a sea-level canal would be encountered along the Caledonia Bay route in contrast to San Blas, although

FIGURE 6 - PREDICTED FALLOUT FROM NUCLEAR EXPLOSIONS AT
CALEDONIA BAY SITE IN ROENTGENS BASED ON 1964
STATE OF TECHNOLOGY



Source: U.S. Congress, Senate, Commerce Committee, *Second Transisthmian Canal*, p. 66.

the elevation at the Continental Divide is the same. Original 1960 cost estimates for nuclear construction of this route ran \$770 million; however, further studies indicate the cost could be reduced to \$500 million.²¹

Atrato-Truando Route through Colombia. The Colombian route lies close to the Panamanian border. Its 95 miles cross uninhabited swampland. Distance from population centers makes the route ideally suited for nuclear excavation. A substantial stretch of the route would make use of the Atrato and Truando Rivers—low swampy terrain—while 80 of its 95 miles transit ground less than 100 feet above sea level. Surveys showed the highest point of elevation at the divide to be 982 feet with only six miles exceeding 400 feet.²² Aerial mapping of this site has been completed. Estimates as high as \$1.2 billion make this route more expensive to construct with nuclear explosives than the Caledonia Bay route, but the Atrato-Truando route would be far less hazardous. An overwhelming number of nuclear engineers favor it. Even if rejected, the Colombian route may serve a very useful purpose. Lying so close to Panama it could well serve as a political lever for negotiation of a new sea-level site in Panama.

FOOTNOTES

CHAPTER IV

1. Aragon, p. 16
2. Senate Commerce Committee, p. 3.
3. Galton, p. 77.
4. In his announcement the President mentioned only four possible routes: two in Panama (San Blas Gulf and Caledonia Bay routes), one in Colombia, and one through Nicaragua and Costa Rica. No mention was made of the Mexican route.
5. Senate Commerce Committee, p. 36.
6. *Ibid.*, p. 18.
7. "Will a New 'Big Ditch' Be Built?" p. 47.
8. Dwight C. Miner, *The Fight for the Panama Route* (New York: Columbia University Press, 1940), p. 101.
9. Senate Commerce Committee, p. 36.
10. Svarverud, p. 57.
11. Earl Harding, *The Untold Story of Panama* (New York: Athene Press, 1959), p. 171.
12. Senate Commerce Committee, p. 36.
13. "Will a New 'Big Ditch' Be Built?" p. 46.
14. The Pacific terminus would be less than 25 miles from Panama City and the Continental Divide crossing, the site of heaviest blasting, under 35 miles from both Panama City and Colon.
15. Galton, p. 72.
16. *Ibid.*, p. 73.
17. *Ibid.*, p. 74.
18. Senate Commerce Committee, p. 61.
19. *Ibid.*, p. 57.
20. *Ibid.*, p. 56.
21. *Ibid.*, p. 40.
22. *Ibid.*, p. 37.

CHAPTER V

THE QUESTION OF INTERNATIONALIZATION

Internationalization of the Panama Canal is not an entirely new idea. President Truman is credited with an offhand suggestion made during the Potsdam Conference of 1945 calling for the internationalization of all the world's major waterways. These included the Suez, Kiel, Rhine-Danube, and Panama canals, and the Black Sea Straits.¹ During the 1956 Suez Canal crisis Senator Flanders of Vermont publicly urged that the Panama Canal should be the first to be internationalized, thus providing Nasser a face-saving precedent for doing the same with Egypt's canal.² The then Senator Hubert Humphrey of Minnesota was a strong advocate of this view. He believed that placing the Panama Canal under international or United Nations control was a prerequisite for settling the Suez crisis.³ Other prominent men subscribing to internationalization of the Panama Canal under United Nations auspices included Congressman James Roosevelt and Great Britain's Labor Party leaders Clement Atlee and Hugh Gaitskill.

Proponents of internationalization under the aegis of the United States or Organization of American States offer arguments for this action which look appealing enough on the surface. The guiding principle behind internationalization assumes that an isthmian canal is so vital to so many nations that no one nation should have exclusive control over it. Supporters of internationalization point out that the real interests of the United States; preservation of the canal, free access, good service at low cost, and a voice in canal operations would be unimpaired by such action.⁴ In the event of total war, international control would make the canal a less attractive target.⁵ If the canal were attacked, it is argued, the United States could come to the defense of the canal acting within Article 51 of the United Nations Charter. Such action would gain greater moral support from the world-at-large than action in defense of an exclusive United States interest.⁶ Finally, it is argued, if Panama were ever pushed to revolution the canal would certainly be nationalized. International communism would not likely be caught looking the other way. Proponents of internationalization make the following conclusion: since United States control of the canal is no longer vital, but preservation of free world shipping is, the canal should be placed under international control.⁷

International control under the United Nations would not serve the best interests of the United States. Control in the hands of the United Nations would invite obstructive pressures and misuse of the Soviet veto power, handing the Soviets the very key to control of Central and South America. Senator Butler of Maryland felt so strongly on this point that he declared internationalization of the Panama Canal would, "sign the death warrant for the entire Western Hemisphere." ⁸ The Panamanians themselves are the last ones that would like to see an isthmian canal internationalized. President de la Guardia and President Chiari, former Panamanian chief executives, have vigorously opposed it.⁹ There was no international convention governing the 1903 treaty, therefore Panama is not obligated to recognize any country's rights other than the United States. Relationships with an international agency would be far more complex and difficult. Panama would undoubtedly benefit less from such an arrangement than she now does. Neither do the Panamanians want to run the canal under OAS control. Operation of the canal under an Organization of American States specialized agency would be less odious than under the United Nations, however. There would be no Soviet veto to contend with, nor would the Afro-Asian bloc be permitted a voice in canal policy. Control would be manifested in the nations of the Western Hemisphere with the United States exercising a dominant role. This is not what Panama wants. Recognizing the efficient management of the present canal, Panama could not risk an interruption of service because of its heavy reliance on canal revenues. The idea of handing over a new sea-level canal to international control, an operation so vital to the local economy, holds even less appeal.

One final international scheme deserves attention. This is the "Colombine Plan" (Primer Plan Colombino) for construction, operation, and maintenance of the sea-level canal. Under this plan an international corporation would be formed to be presided over, and under the sovereign control of, the host country. The plan envisages worldwide subscription of stock open to individuals, companies, and governments. Stock would be sold with the proviso that no single country would hold a commanding number of shares. An exception would be made for the host country or a Latin American pool of countries to enable the purchase of stock for sale in the future. Bids for nuclear excavation of the canal would be solicited from the world's atomic powers. Five percent of current operating costs would be set aside annually for maintenance. The plan anticipates a high

return on the initial investment based on projections of upwards of 15,000 ship passages per year by 1985. Canal revenues of \$120 million annually are expected by the year 2000. The somewhat visionary Colombine Plan concludes, "Seeing several atomic powers employ their weapons of destruction for peaceful purposes will be a beautiful sight to behold in this world plagued by dis-sension and hatred. Panama or Colombia will be proud to be the ground for this tournament of peace." 10

FOOTNOTES

CHAPTER V

1. Miller, p. 71.
2. Harding, p. 121.
3. *Ibid.*, p. 122
4. Martin B. Travis and James T. Watkins, "Control of the Panama Canal: an Obsolete Shibboleth?" p. 417.
5. Martin B. Travis and James T. Watkins, "Time-Bomb in Panama," p. 380.
6. Martin B. Travis and James T. Watkins, "Control of the Panama Canal; an Obsolete Shibboleth?" p. 417.
7. Martin B. Travis and James T. Watkins, "Time-Bomb in Panama," p. 381.
8. Harding, p. 129.
9. "A New Pact on the Panama Canal?" *U.S. News & World Report*, 25 June 1962, p. 26.
10. Aragon, p. 17.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

The fact is inescapable that the United States must maintain a continued and growing interest in the American isthmus. We are the only hemispheric nation possessing the financial and technological resources necessary for nuclear construction. We have the most at stake in a new sea-level canal and are in the best position to insure that its completion and operation will serve the interests of all.

The new canal should be built in Panama at the Caledonia Bay site. This site is chosen as the shortest route readily adaptable to nuclear excavation. The use of nuclear devices and cratering technology in the canal's construction will allow for the speediest possible construction at the lowest possible cost. Proximity to the present centrally located Panama Canal will alter shipping routes of the world to the least possible degree. Locating the new canal in Panama will enhance rather than hinder her economy. Conversely, locating the sea-level canal outside of Panama would be ruinous to her economy which is so deeply dependent on canal revenues. Overnight the country would be ripe for communist subversion and control.

Full sovereignty over the sea-level canal should be vested in Panama. The sea-level route, lacking complex operating machinery and the necessity for accompanying technical personnel, requires no zone separating it from adjacent Panamanian territory. Upon opening the new canal to operations, the present Panama Canal, being operationally obsolete, should revert to Panama for use as she sees fit. Old canal debts due the United States should then be written off. Having regained full sovereignty over all Panamanian territory, the political posture of the United States in relation with Panama should be greatly enhanced.

In negotiating the sea-level canal treaty with Panama the United States must insist on three unequivocal conditions. First, the canal must be open to the free passage of the ships of all nations with the same scale of tolls charged to all. Secondly, the United States must retain unrestricted use of the canal for movement of its military forces in peace or war. Lastly, the

United States must insist on its right to defend the canal in event of war or attack.

The canal should be operated as a joint venture by Panama and the United States, each contributing 50 percent of the operational and administrative personnel required. Annually a portion of operating revenues should be set aside to retire the United States' capital investment—the cost of building the canal. Additionally, five percent of revenues should be set aside for canal maintenance. The ever-increasing volume of shipping using the canal coupled with extremely low operating costs inherent in a sea-level canal operation, due to the absence of expensive machinery and skilled technicians, will leave a substantial balance in the form of profit. Sea-level canal tolls should remain at their present levels. Shippers using the new canal will experience no delays and faster transit time which equates into quicker turn around time and greater profits for the same toll charges. Revenue remaining after annual retirement of capital investment and reserves for maintenance should be shared equally between Panama and the United States. What Panama does with her share, which should be many, many times greater than the ten million dollar per year annuity proposed under the revision of the existing Panama Canal treaty, will be Panama's decision.

The United States, on the other hand, has in its share of canal profits a golden opportunity to live up to its responsibilities toward Central America and demonstrate to the world the qualities which make our country great. The United States should take its half of the canal's operating profits and turn them over to a Central American agency set up for the purpose of area development. Our nation would hardly miss this source of revenue while at the same time would stand to profit by its distribution by a factor many times over its real dollar value. The financial agency thus established would pool our share of the canal profits for financing Central American economic development. A governing board composed of representatives of each Central American nation would approve projects submitted to it and lend development funds at a very low rate of interest. Thus the fund would be revolving and ever-increasing as subsequent yearly canal revenues and interest payments were added. Even those countries whose sites were not chosen for the canal would thus still participate in canal profits. The stigma of the dole would be eliminated and the dignity of the borrowing country upheld by the interest payments. In this way a small beginning could be made to build a needed cement plant here, a shoe factory there, and a

rubber tire factory somewhere else, perhaps under the guidance of the Central American Common Market. Later on, as increasing profits accumulated, larger enterprises could be undertaken. By strengthening the economic base of Central America in this manner, poverty would be reduced and the living standard of the people rapidly improved, thus thwarting the spread of communism. The *Yanqui* image of the rich Goliath of the North paying little heed to Latin American needs should vanish as material advantages become widespread.

Such a plan would be a manifestation of our acceptance of the moral obligation toward our Latin American neighbors less fortunate than ourselves. By our actions the United States would demonstrate before the world our willingness to yield a little politically and economically for the common good of all, while at the same time reaffirming our position as the hemisphere's number one power and leader of all the world's free peoples.

TABLE II
SEA-LEVEL CANAL FACTOR GRADING MATRIX

	TEHUANTEPEC (MEXICO)	NICARAGUA- COSTA RICA	SAN BLAS GULF	CALEDONIA BAY	ATRATO- TRUANDO
ECONOMIC IMPACT OF CANAL ON HOST NATION(S)	1	3	4	4	2
PROBABILITY OF ADVERSE POLITICAL REACTION IF CANAL BUILT ELSEWHERE	2	2	4	4	2
STRATEGIC IMPORTANCE TO UNITED STATES	3	2	2	2	2
SUITABILITY TO NUCLEAR CONSTRUCTION*	1	3	1	4	4
DESIRABILITY OF PHYSICAL FEATURES	1	1	4	3	2
RELATIVE CONSTRUCTION COST*	1	3	1	4	3
SCORE	9	14	16	21	15

*Relative construction costs are calculated on the basis of suitability to nuclear construction. Conventional cost estimates are utilized where route is not suitable for nuclear excavation.

1 - POOR; 2 - FAIR; 3 - GOOD; 4 - EXCELLENT

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NEW DIMENSIONS IN EXTENSION

DID YOU KNOW THAT . . . the Correspondence Courses offered by the Naval War College assist in giving new meaning and added light to the daily news? A recent student of the Correspondence Course in National and International Security Organization stated it this way:

This [course] has been very worthwhile to me. It makes the daily newspaper and radio newscasts much more meaningful with regard to events in Vietnam and the Dominican Republic—and around the world in general.

Speaking of an assignment in the Counterinsurgency Correspondence Course, another student stated:

It has focused my attention on the mechanics of communist offensive the world over, which cannot be had from reading of the daily newspapers or magazines. These give nothing more than an 'effect' account, while the 'cause' remains a mystery until gained from such directed study as prescribed in this course.

Another student felt he had benefited even from the first assignment of the Counterinsurgency Course, stating:

I have begun to analyze current events from a different perspective, relating newspaper and magazine articles to the questions posed in this installment [assignment].

DID YOU KNOW THAT . . . Naval War College Correspondence Courses offer a challenging method of obtaining professional education? One officer who recently enrolled in the Military Planning Course put it this way:

This is my fourth Naval War College Correspondence Course. Not only have they all been challenges, but they are the most educational courses I have ever taken.

DID YOU KNOW THAT . . . the following officers have recently completed the Correspondence Course of Naval Command and Staff and have been awarded diplomas for this significant achievement? This course consists of the following four correspondence courses (or their equivalent): National and International Security Organization, Military Planning, Naval Operations and Command Logistics. Completion of these four courses closely parallels a command and staff level of education.

RADM Richard O. Patterson, USNR (Ret.)

CAPT Lee E. Bains, USNR

CAPT George P. Steele, II, USN

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THE U.S. NAVY PLANNING AND BUDGET PROCESS

A lecture delivered
at the Naval War College
to the Naval Command Course
on 20 August 1965

by

Captain Parker C. Cooper, U.S. Navy
Executive Assistant and Senior Aide to the Director,
Navy Programming (General Planning and Programming)
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Gentlemen, I am privileged to speak to you today on the Planning, Programming, and Budgeting processes in the United States Navy. Since you represent the Navies of the Free World, you are familiar with the details of these processes in your own countries. My objective this morning is to explain the procedures we use in our Navy, and show how these support our International Commitments.

My remarks this morning might well be entitled, "The Three M's," rather than "Planning, Programming, and Budgeting."

The Three M's relate to the fundamental assets of any country, and they serve as the foundation of national power. Wise employment of the Three M's may well be the most important task which faces all of our nations. I am, of course, speaking of "Men, Money, Materials," or the total which might be broadly called "Resources."

In the Planning, Programming, and Budgeting processes, we deal with three time frames—the past, the present, and the future. The past is a matter of record and interesting from the point of view of what we have learned—the future is what we forecast it will be—and, as we trace these processes in the present, you will see that our actions bridge the gap between lessons learned and future courses of action.

Planning, Programming, and Budgeting as methods of management, have been used by the Navy for years, but without the formal techniques and terminology which would make them recognizable today. The National Security Act of 1947 provided the substance, and the Department of Defense Programming System furnished the form, for a standard planning and programming system for all of the Services and Defense Agencies. The System is the process by which the program decisions, which determine force levels, weapons alternatives, and courses of action, are made.

These processes are part of our overall government procedures. All Government agencies receive their guidance from the President. From this guidance the National Security objectives are derived.

National Security objectives are the basis for strategic concepts. These concepts will determine how forces are selected and employed.

Closely related to strategic concepts is the allocation of resources to development and deployment of the forces to support these concepts.

The final step is the actual operation of the military establishment. The application of power is difficult, and often unpredictable, in the world today. How well the planners, and the commanders in the field, support national policies is the ultimate measure of the effectiveness of the military establishment.

The three interrelated elements in the orderly flow from the concept of a force or activity to its appearance as a part of our operating forces are: *planning, programming and budgeting*:

PLANNING - The process of determining actions and specifying time-phased military force requirements to accomplish a mission.

PROGRAMMING - The process of translating planned military force requirements into time-phased manpower and material resource requirements.

BUDGETING - The process of translating manpower and material resource requirements into time-phased financial resources.

Programming bridges the gap between planning and budgeting. We translate our well-developed plans into budgetary actions through what is called the "Programming System."

In matters which deal with National Security Policies, the Secretary of Defense provides guidance to the Secretaries of the Army, Navy, and Air Force and the Directors of the DOD Agencies. In turn, these officials establish policy within their own departments and agencies. At the same time, the Joint Chiefs of Staff, under the Secretary of Defense, develop military objectives and the necessary plans to achieve these objectives. These plans assign missions and tasks to be performed by the various commanders in the field, and they specify the necessary forces to carry out the plans.

Once the National Policy has been established, and the Secretary of the Navy has issued his policy guidance, the Chief of Naval Operations and the Commandant of the Marine Corps prepare plans to support joint plans and other directives of higher authority. Based on the broad requirements in these plans, the various Bureaus and Offices within the Navy Department take the necessary action to accomplish the goals stated. These goals are under continuous review by the Chief of Naval Operations, the Commandant of the Marine Corps, the Secretary of the Navy, and the Secretary of Defense.

The Joint Chiefs of Staff have approved a joint program for planning which provides for one joint study and two joint plans.

The Joint Long-Range Strategic Study (JLRSS) covers a period ten years after its date of approval and extends for four years thereafter. It provides a broad strategic appraisal which will assist in the development of long-range strategic guidance, provides military concepts and strategies for the long-range period and develops general strategic guidance to support the attainment of national objectives. It also provides general guidance for military research and engineering objectives and for military policies, plans, and programs in support of the strategic concepts for the long-range period.

Joint Strategic Objectives Plan (JSOP-FY) is the annual mid-range plan which provides strategic and logistic guidance for the mid-range period. It covers the mid-range period commencing five years after the beginning of the fiscal year in which it is approved. It serves as one of the bases for the formulation and justification

of the annual departmental budget estimates. Of particular interest to you, gentlemen, is that it provides assistance in the establishment of a U.S. military position with respect to: Military assistance to our allies under conditions of cold, limited, and general war.

Joint Strategic Capabilities Plan (JSCP-FY) is prepared annually to translate U.S. national objectives and policies into terms of military objectives for the short-range period. It constitutes a directive to the commanders under the Joint Chiefs of Staff for the conduct of operations in cold, limited, and general war; it provides strategic logistic planning guidance, and it also provides assistance in the establishment of U.S. military positions with respect to *assistance to our allies and the development of NATO and other allied short-range plans.*

The basic Navy Planning System supports, and is responsive to, the plans of the Joint Chiefs of Staff. Since the Joint Chiefs of Staff are responsible for the strategic direction of the armed forces, Navy plans must provide for the desired forces.

The Navy Long-Range Strategic Study (NLRSS) provides guidance for Navy long-range planning, including research and development, for a ten-year period commencing 1 July, ten years after the end of the fiscal year in which approved. It is a basis for the Navy input to the Joint Long-Range Strategic Study (JLRSS).

The Navy Mid-Range Study (NMS) provides the basic guidance to be used within the office of the Chief of Naval Operations for Mid-Range Planning, for a five-year period commencing 1 July, five years after the end of the fiscal year in which approved. It is a basis for: the Navy Strategic input to the Joint Strategic Objectives Plan (JSOP); the development of research and development goals; and mid-range strategic guidance used in the development of the Mid-Range Objectives (MRO).

The Mid-Range Objectives (MRO) derive the force goals for the eleventh fiscal year subsequent to that in which approved. The upper limit is the set of force levels necessary to execute all the Navy's assigned tasks efficiently and with reasonably high expectation of success, subject to physical and technical constraints only. A lower limit is set by applying fiscal and policy restrictions. This latter becomes the basis for the initial program objectives forces, and hence for the initial Navy force level inputs to JSOP and the Navy's Program Objectives.

The Navy's Planning System serves three basic purposes:

(1) It provides for the development of Navy concepts, requirements, and objectives, and for their presentation as the Navy's viewpoint to the Joint Chiefs of Staff and the Secretary of Defense.

(2) It provides a framework for the translation of strategic and operational concepts into research and development, personnel, and support plans and objectives.

(3) It gives guidance and direction in the use of current capabilities.

For many years management within the Defense Department and the individual Services was basically exercised through financial management. The principal instruments of the manager were the budget groupings and the appropriation. However, there were no means available whereby a plan or objective of a Service could be assured continuity from year to year, because appropriations, being made annually, were subject to two major forces. First, because of the routine rotation of personnel, attitudes expressed by the individuals responsible for requesting appropriations would change to the extent that previously planned items were no longer supported. As a result of these changes in sponsorship, many plans were abandoned by default.

A second influence was exerted by the course of events in which enthusiasm for newer developments reduced popular and Congressional support for planned courses of action. Even legislation has failed to bind the Congress or officials to funding of planned objectives. History holds many examples of projects planned to extend over a period of years, started under an annual appropriation, but which failed to receive further and successive appropriations, and had to be abandoned after large sums of money had been initially expended in their support.

As a measure conceived to ease these problems, the Department of Defense Programming System provides an extension of the planning horizon out to eight years in terms of force structure, and five years for financial levels, in order to display the long-range implications of programs and provide a basis for their future support.

Another problem, inherent in the exercise of financial management through the appropriations category structure, was the difficulty of relating budgets to military missions and tasks. To overcome this difficulty, the Programming System has established a mission-oriented management structure based upon the four primary military tasks: Winning an all-out war; defending the country against attack during a war; fighting a conventional or limited war; and moving fighting forces to the scene of action, when needed. These in turn, have been backed by general support activities, such as reserves, research and development, and logistic support.

The Programming System in general reflects the results of an extensive study by Mr. Charles J. Hitch, the former Assistant Secretary of Defense (Comptroller). After his appointment, he directed the Services to develop and implement their own portions of an integrated Department of Defense Programming System.

What is the fundamental objective of the DOD Programming System?

. . . to integrate the planning and programming and the financial management functions in order to provide better tools for decision-making by the Secretary of Defense and his military advisors; and to create a planning and programming/financial management system that is keyed to continuous program decision-making and not just geared to the annual budget cycle. In such a system, not only would budget decisions be program decisions, as they inevitably are now, but program decisions would be budget decisions. That is, decisions to embark on programs would be explicitly decisions to provide the resources required to carry them out.

The purpose was to bridge the gap between Planning and Budgeting with the following major objectives:

(1) Planning is oriented around major missions. Program planning is on the basis of broad military missions, which cut across traditional organizational lines, rather than being based on single service plans and priorities.

(2) Ability to relate resource "inputs" to military "outputs." "Inputs" of manpower, material, and installations, together with their costs, must be related to the "outputs" of military forces.

The Programming System is designed to provide both financial and nonfinancial estimates of the resource inputs required to obtain specified military outputs.

(3) Coordination of long-range planning with budgeting. Budget decisions must be compatible with long-range programming decisions. Conversely, long-range plans must be compatible with the forecast of resource availability. To coordinate long-range military planning with short-range detailed budgeting, programs and their costs are projected five years into the future, with major military forces projected an additional three years.

(4) Continuous appraisal of programs. The Programming System must provide a means for continuous review of program decisions, and a mechanism for changing programs whenever a need for change is recognized.

(5) Progress Reporting. Control of approved programs must be exercised through a system of progress reports, which highlight significant deviations from approved plans. This is required so that timely corrective action may be taken.

(6) Ability to make cost-effectiveness comparisons. The system must provide both physical and financial information in forms suitable for making cost-effectiveness studies of alternate force structures.

(7) Integration of Department of Defense information system. A long-range goal of defense management is establishment of an integrated management information system, which will provide not only the information needed in support of the Department of Defense Programming System, but also budget and other needs now served by separate reporting systems.

The principal document of the Department of Defense Programming System is the Five-Year Force Structure and Financial Program, which contains all of the approved programs for all Services and Defense agencies. That portion which contains Navy programs is issued separately as the Navy Five-Year Force Structure and Financial Program, and this in turn, is the basic document of the Navy Programming System.

The Five-Year Force Structure and Financial Program is the:

(1) Foundation of the Department of Defense Programming System.

(2) Sum of approved programs. As the official program for the Department of Defense it includes:

(a) forces for eight years in the future

(b) remainder of program (manpower, costs, material items, etc.,) for five years in the future.

(3) Department of Defense base for submission of proposed changes to the approved program.

Now within the Programming System every Department of Defense activity falls within what may be termed a Program Element.

By definition, a Program Element is an integrated activity, a combination of men, equipment, and facilities, which together constitute an identifiable military capability or support activity.

A Program Element represents a well-defined, homogeneous aggregation of military activity.

The purpose of the Program Element structure is to package these units most meaningfully and conveniently for top-level decision-making.

All Program Elements taken together constitute the complete Defense Establishment.

There are over 1,000 Program Elements within the Department of Defense of which about 300 are Navy and Marine Corps elements.

A Major Program consists of Program Elements organized into a major category which either complement each other or are close substitutes. Hence, they should be considered together in making major-program decisions.

Major Programs cut across the entire Defense Establishment without regard to Service or agency.

All Major Programs taken together constitute the complete Defense Establishment.

There are eight Major Programs in the Defense Establishment:

- (1) Strategic Retaliatory Forces
- (2) Continental Air and Missile Defense Forces
- (3) General Purpose Forces
- (4) Airlift and Sealift Forces
- (5) Reserve and Guard Forces
- (6) Research and Development
- (7) General Support
- (8) Military Assistance Program,

Since there are constant changes in technology, resources, and commitments, there is a system for entering changes into the system. Changes are called "Program Change Proposals." These are submitted to the Secretary of Defense by the Navy, the other Services, the Joint Chiefs of Staff, and even by his own office. Proposed changes are examined with the same care that is paid to the original items in the Program. Particular attention is given to a detailed analysis of the proposed changes in relation to their cost/effectiveness. Changes to the Program may be submitted at any time during the year, and the five-year force structure is updated quarterly—as changes are approved. The important thing to remember is that the program is always current, because there are continual changes in it.

The "Five-Year Force Structure and Financial Program" forecasts for a five-year period what our programs are going to be. It is what every good manager does—he lays out a plan, over a period of time, to accomplish his purposes. In addition to the plan for forces, manpower, and technical development, he must try to forecast what it will cost, and be prepared to make changes in his plans.

Now, gentlemen, I would like to turn to the third and last element in the Navy's Planning, Programming, and Budgeting Process. This, of course, is the budgeting process. So far we have talked of Navy Plans and the Programming which start the wheels in motion and monitors these programs. The final step is to get the money to carry out these plans and programs.

I would imagine that in all of your countries, as in ours, this is one of the most lengthy, complicated, and frustrating of governmental procedures. I like to think of our Navy Budgeting process as a series of building blocks—one built on the other. The final result is the appropriation of the necessary money by our Congress to carry out our programs.

Our financial year starts with 1 July and ends the following 30 June. We start on our budget about eleven months before the beginning of each fiscal year. At this time, the first of August, the various Bureaus and Offices in the Navy Department submit their estimates to the Secretary of the Navy. About three months later, the first of October, the Secretary of the Navy, after reviewing, approving, and in some cases disapproving these budget estimates, forwards the Navy's budget to the Secretary of Defense. Let me emphasize one point. Before the Navy's budget ever leaves the Navy Department, there have been thousands of man-hours expended in coming up with the budget estimates. To stay within the guidance that is given us, there must be a lot of "give and take" within the Navy Department. When the problems have been resolved, often by the Secretary of the Navy himself, the Navy's budget is ready for review by the Secretary of Defense.

Within the Office of the Secretary of Defense our budget is again reviewed very carefully within the overall Department of Defense budget picture. Each year we are called upon to supply detailed justification for our requests.

Once the budget request is agreed upon, it becomes part of the Federal Budget which our President submits to Congress in January of each year. So far we have talked only about the request (please note that it is only a request) of the Navy for the money which we believe that we need.

Within the Congress there is once again a searching analysis of our request.

Gentlemen, in a short time this morning I have tried to outline the Navy's Planning, Programming, and Budgeting processes

We start with our objectives and plans; through the planning process we develop these plans into programming. The programming process leads us to the budget. As conditions change or technological breakthroughs occur, we refine our programs with the necessary changes. Changes to programs and new programs

put life and vigor into the System. As programs appear in their final form, new objectives and plans are formulated, and this starts the cycle all over again.

In conclusion, Navy Planning, Programming, and Budgeting is a dynamic system which sets forth the annual "Work Plan" of the Navy Department. It represents the best judgment of the various levels of authority within the administration, and in the Navy, to carry out its missions. We approach the Planning, Programming, and Budgeting processes with the realization that they are of the utmost importance to the Navy, to our Nation as a whole, and to our many allies around the world.

BIOGRAPHIC SKETCH

Captain Parker C. Cooper, U.S. Navy

SPECIAL QUALIFICATIONS:

Former PPC several patrol types, PC R4D, R5D.
Nuclear Weapons Employment
Amphibious Operations

EDUCATIONAL BACKGROUND:

University of Pennsylvania, 1950-1952
University of New Mexico, 1958-1960

DUTY ASSIGNMENTS:

Office CNO	Exec Asst and Senior Aide to the Dir, Navy Programming (General Planning and Programming)	1964-
NavWarCol	Student	1963-1964
USS <i>Princeton</i> (LPH-5)	Navigator, CDO (Import and Underway), Staff Nav CJTG 8.3, Staff Nav CTG 76.5 (Ready Amphib Group)	1962-1963
Patrol Squadron NINETEEN	CO	1960-1961
Field Command, Defense Atomic Support Agency	Aide and Admin Asst to Navy Deputy Comdr	1958-1960
Armed Forces Staff College	Student	1958
Patrol Squadron TWENTY EIGHT	Admin	1956-1957
Staff, COMNAVFE	Asst Air Ops	1955-1956
Staff, Commander Blockading and Escort Force (CTF-95)	Air Ops	1954-1955
USS <i>Princeton</i> (CVA-37)	Air Dept, Senior Underway Watch Off	1952-1954
General Line School	Student	1952
Univ of Pennsylvania	Student, 5 term program	1950-1952
Staff, CFAW-14	Admin/Pers	1948-1950
VPM-1 and VP-HL 2	Typhoon Weather Recco	1947-1948
Various VR Squadrons	Pilot	1944-1946

PROFESSIONAL READING

The evaluations of recent books listed in this section have been prepared for the use of resident students. Officers in the fleet and elsewhere may find these books of interest in their professional reading.

The inclusion of a book in this section does not necessarily constitute an endorsement by the Naval War College of the facts, opinions or concepts contained therein.

Many of these publications may be found in ship and station libraries. Certain of the books on the list which are not available from these sources may be available from one of the Navy's Auxiliary Library Service Collections. These collections of books are obtainable on loan. Requests from individual officers to borrow books from an Auxiliary Library Service Collection should be addressed to the nearest of the following special loan collections.

Chief of Naval Personnel(G14)
Department of the Navy
Washington, D.C. 20370

Commanding Officer
U.S. Naval Station
Library (ALSC), Bldg. C-9
Norfolk, Virginia 23511

Commanding Officer
U.S. Naval Station
Library (ALSC)
San Diego, California 92136

Commanding Officer
U.S. Naval Station (Pearl Harbor)
Library (ALSC) Box 20
San Francisco, California 96610

Commanding Officer
U.S. Naval Station (Guam)
Library (ALSC) Box 174
San Francisco, California 96680

BOOKS

Alperovitz, Gar. *Atomic Diplomacy*. New York: Simon and Schuster, 1965. 317 p.

This book is certain to be highly controversial. Based upon an intensive study of certain major aspects of great world affairs between April and September 1945, it seeks to prove that the real purpose of dropping the first atom bomb on Hiroshima in August of that year was to intimidate Soviet Russia, not to save American lives by ending the Pacific war before an invasion of the Japanese homeland became necessary. According to the author, President Truman and his advisors had sharply reversed American policy toward Soviet Russia after President Roosevelt's death by adopting a tougher line toward Stalin. He feels that the United States failed to live up to its promises at the Yalta Conference and that the only purpose of the Potsdam Conference was to put off any major postwar decisions until Stalin had been intimidated by the atom bomb.

In writing this book the author used not only all the published sources, but also the unpublished papers of the 1945 Undersecretary of State, Joseph C. Grew, Secretary of War, Henry L. Stimson, and Fleet Admiral William D. Leahy, who served as Personal Chief of Staff to both President Roosevelt and President Truman. Though he has done a splendid job of research, he has written within a frame of reference which is very far, indeed, from representing the universal historical consensus. There are many who do not share his obvious assumption that the terms of the Yalta Agreement were in the best interests of the United States, and whose estimate of President Truman is likely to be enhanced by the evidence afforded by this book. There are, moreover, those who will feel that whatever the real reasons for the dropping of the atom bombs on Japan in 1945, the world would never have grasped the military significance of nuclear energy without this demonstration. One can, of course, argue that it was unwise to knock out Japan completely as a Great Power, but the decision to do this had been made by Roosevelt, not by Truman.

C.J. SMITH
Ernest J. King Chair of Maritime
History

Ginsburgh, Robert N. *U.S. Military Strategy in the Sixties*. New York: Norton, 1965. 160 p.

Here the reader is given a brief and concise, but relatively comprehensive, analysis of the developments in United States strategy, beginning with the Revolutionary War and continuing, broadly, through 1970. The author has done an admirable job in outlining the various domestic influences on national military strategy, such as the interrelationships and interactions between the military and civilian components of the Department of Defense and the executive and legislative branches of the government, and the American concepts of legality and morality. In addition, he makes a meaningful comparison of the fundamental differences and similarities in the national strategies of the United States and the U.S.S.R. The advanced student of strategy and international relations will find little in the book that is particularly revelatory or profound. However, it is an excellent primer and a valuable summary synthesis and is highly recommended as such.

R.F. KENNEY
Commander, U.S. Navy

Heilbrunn, Otto. *Conventional Warfare in the Nuclear Age*. New York: Praeger, 1965. 164 p.

This work is a valuable and most timely contribution to the study of modern warfare. Having written books on guerrilla warfare, partisan warfare, and warfare in the enemy's rear, Dr. Heilbrunn now turns his expertise to the contemplation of a major conflict between nuclear powers. With tight reasoning and clear logic, he analyzes the possible courses of action available to NATO in the event of an attack by the Soviets. He carefully weighs the advantages and disadvantages accruing to the attacker, or the defender, with the introduction of nuclear weapons by either side, and he makes a fair case against those who would base NATO's defense upon the use of tactical nuclear weapons. In fact, the only case in which he considers that either side gains a clear advantage by the introduction of nuclear weapons is in the preemptive mode; and in most other cases the Russians seem to have a slight edge. Thus, he presents the rationale for a NATO defense strategy limited to conventional means—something which, he makes quite clear, NATO is ill-prepared to implement. This is the second major thesis of his book. While the war contemplated may be conventional, the tactics are dictated by the nuclear capabilities of the opponents.

The continuous front line and massive logistic complexes of World War II are too vulnerable and too tempting as nuclear targets for the aggressor. As an alternative, Dr. Heilbrunn turns to his theory of warfare in the enemy's rear, a free-wheeling, circling type of combat which seeks to disorganize and destroy enemy forces, and control territory without actually holding it, much as guerrillas do. And, of course, at no time must either side present an appropriate target for nuclear attack to his opponent; nor may he be too successful, lest the opponent launch nuclear war to avoid total defeat. The command and control problems of this type of warfare are recognized by the author, but apparently are not considered insurmountable. Be that as it may, even if NATO could fight a conflict in the manner that is outlined, the author makes very clear the point that a drastic increase in combat troops will be required because the defense can no longer contain a numerically superior attacker in conventional warfare in the nuclear age. The book is highly recommended to the student of NATO and of military tactics in general. The bibliography and documentation are excellent and comprehensive.

G.H. WINSLOW
Commander, U.S. Navy

Kahn, Herman. *On Escalation*. New York: Praeger, 1965. 308 p.

As the result of a Martin Company contract to the Hudson Institute to study issues that might be of special interest to United States defense planners, Herman Kahn prepared one of the final report documents entitled, *On Escalation: Metaphors and Scenarios*. This extremely interesting and thought-provoking book is based on that original study by Herman Kahn. Both escalation, which is used to describe an increase in the level of conflict in international crisis situations, and negotiation are addressed in their important role in international relations. Specifically considered are the political, diplomatic, and military issues surrounding a conflict and the level of violence and provocation at which it is fought. This book is written in layman's language utilizing extremely simple metaphors, i.e., the "Chicken" or no face-saving example and the "Labor Strike" where both sides need each other. It focuses attention on the use and misuse of escalation tactics and strategies utilizing the escalation ladder encompassing the entire spectrum from ostensible crisis to all-out nuclear exchange as scenarios. The author acknowledges the fact that he cannot present all possible situations which might arise, but believes a realistic sample is

provided. He does not think that a nuclear war will necessarily result in a holocaust or that a single nuclear explosion will trigger a large-scale nuclear war. Herman Kahn feels that the many shades of grey up and down the spectrum are distinctly more of a possibility than a nuclear spasm. He also believes that United States political and military planning is weak in this area. He suggests some important planning factors which should be addressed by our national planners. *On Escalation* is recommended for military and political readers because of the insight that it furnishes into the many military/political situations which might confront the United States in the future.

W.D. CLARK
Colonel, U.S. Air Force

Lapp, Ralph E. *The New Priesthood*. New York: Harper & Row, 1965. 244 p.

In an age characterized by wholesale innovation, wherein startling breakthroughs no longer startle and in which the impossible is just around the next research corner, the emergence of a work on the elite of the era was inevitable and, indeed, by now, has been a long time coming. Happily, Mr. Ralph E. Lapp, who has stepped into the breach with his volume *The New Priesthood*, equipped as he is both as a scientist in his own right and as a successful man of business, appears to possess the necessary background to address his subject with depth and validity. In *The New Priesthood* Mr. Lapp suggests that the widespread preoccupation with, clamor for, and even dependence on, new advances in all fields of science, from the most trivial to the most significant, portends grave danger to the continuity of the American democratic process as we know it. His "new priests," the scientists, are likened, in an easily believable way, to the medicine men of tribal societies in that they tend to hold tight to their specialized knowledge and to the jargon of their profession in an effort to impress and to awe both the public and its elected officials in a manner readily reminiscent of the witch doctors with their masks, rattles, potions, and incantations. It is Mr. Lapp's fear that the new "priests," as a class, take advantage of their currently emphasized importance coupled with the aura of mystery in which they operate to garner unto themselves not only prestige but (and it is here that "threat" enters as a consideration) an over-proportionate share in government appropriations and in decision-making opportunities in areas in which they have neither the right nor the competence to speak. As the only work

of its kind up to the moment, and because of its obvious implications within the framework of national defense, *The New Priesthood* is particularly pertinent reading for military and naval officers as well as for all thinking individuals concerned with industry, government, or public affairs. It should, however, be viewed correctly as only one approach to a subject on which many facets remain unexplored. *The New Priesthood* is not a long book and is easy reading, but it should be perused critically and searchingly as well as open-mindedly.

C.M. DUGHI
Commander, U.S. Navy

Lerche, Charles O., Jr. *The Cold War . . . and After*. Englewood Cliffs, N.J.: Prentice-Hall, 1965. 150 p.

In *The Cold War . . . and After*, Professor Lerche of American University has attempted a searching and dispassionate analysis of Soviet-American cold war relations since 1945. He concludes that the cold war as a historical era is drawing to a close and that relations between the two world giants, although destined to remain fiercely competitive for the foreseeable future, is gradually reverting to the classical concept of great power relationships of the type associated with the Congress of Vienna. The main thrust of the author's thesis supports the popular belief that while the international climate is still basically glacial, the antagonists are at last learning to adapt meaningfully to the vicissitudes of their environment and the pressures of each other's ambitions. The chapters dealing with the Soviet Union's grand strategy of "initiative" versus that of "response" or "reaction" by the United States are of particular value to the serious student of international affairs. In them Professor Lerche boldly addresses one of the most chronically galling questions concerning the conduct of American foreign policy: how could a nation which justifiably prides itself in the collective enterprise, flexibility, and initiative of its people become rigidly shackled to a defensive cold war posture? His theory suggests that the dead hands of the isolationist tradition coupled with a utopian view of the international scene imperceptibly molded our position in the early years of the conflict. The book, as befitting its serious subject matter, is not designed for casual reading. The occasional pedantic and redundant lapses are easily counterbalanced by the lucid exposition of ideas and convincing, well-supported discussions. In all, *The Cold War . . . and After* should prove to be a useful research source for the professional military officer.

W.J. WHITE
Lieutenant Colonel, U.S. Marine
Corps

— NOTES —