RETRIEVAL
AT
PANAMA

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RETRIEVAL AT PANAMA
THE PANAMA CANAL.
PROJECT OF LINDON W. BATES.
DEDICATION.

To my wife, co-laborer in the production of these papers,
the book is inscribed.
INTRODUCTION.

New York, March 16th, 1907.

To the Public:

In his elucidation of the Panama Canal problem, through The New York Press, the service which Mr. Lindon W. Bates has performed is of such value to our Nation and to all civilization, that there ought to be no unnecessary restriction on the dissemination of his masterly articles, among both the members of his profession and the public at large. For what he is doing to make possible the construction of the RIGHT waterway across the Isthmus, The New York Press as one of the champions of sound American institutions, is profoundly grateful. Not only is it a great pleasure to grant Mr. Bates all rights to use in any manner he sees fit the material which he has contributed to our columns from his wealth of scientific attainments and technical experience with the greatest engineering projects of the globe, but it is a duty.

In extending to him the freest employment of all his articles published in our columns, we can only repeat, in behalf of our hundreds of thousands of constituents, our heartfelt thanks to him for his patriotic labors.

Ervin Wardman,
Editor.
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PREFACE.

Nearly four years ago the United States intrusted the Panama Canal to an Isthmian Commission, which was placed under the personal direction of the Secretary of War.

After a notable engineering conflict, of half a century, Congress pronounced for a lock canal. The vote endorsed the general type only. There was no legislative acceptance of the hazardous and unsound features disclosed to the Senate Investigating Committee. The official estimate for the completion of the waterway was nearly one hundred and forty millions. The original grant was one hundred and forty-five millions inclusive of Sanitation and Zone Government. With the eight millions, allowed by executive order in September, 1907, and the various sums authorized by Congress for canal purposes the appropriations now total $85,310,201.08. This is exclusive of the $2,298,357.50 voted for retiring the railway bonds and reported still part of the "balance available July 1, 1907."

The call for the next fiscal year beginning July, 1908, is for another 33 million. At the next session of this Congress then only 25 to 27 millions will remain to call, to cover the entire expenses for the remaining years of the construction era. Were this time but seven years and the rate never above the last two demands, the deficit without interest would still amount to above two hundred million dollars.

Over 41,000 men are upon the books. The Isthmus payroll including the railroad force is about one and three-quarter millions a month. In eight years such a rate will amount to 168 millions, for wage alone.

The public has not learned from any official announcement, the monumental deficits in sight. When this Congress grants the new 33 millions already asked there will be left not a seventh of the 195 millions allotted by the Spooner Act to the purchase and the construction of the Panama Canal. There must be, with the present design, over ten more draining years and a total cost with interest of upwards of 550 millions. Other public works must be scaled or deferred in an era of financial stress to pay for this insatiate scheme, whose stupendous structures with no justification in reason or expediency involve the maximum hazard to our defense and the minimum service to the world's commerce.
PREFACE.

The facts of the Panama situation and technique and the inevitable consequences of the effort to carry out the adopted scheme have no general realization.

Subsequent to the publication early in 1907 of the papers, which are incorporated into this book, a new Isthmian Canal Commission was appointed.

The simultaneous abandonment of the iniquitous Percentage and Chinese Labor Contracts, opened apparently a better prospect for the waterway.

With the advent of the new men came certain palliative measures. The conviction became general that engagements, henceforth, would be normal, regular and responsible; that excessive and useless purchases would be disconfident and that whatsoever these Engineers were directed to execute, would reflect the best traditions of the Service.

The months have justified the faith so far as it could be lived. In devotion, silence and dignity, they have bent to the task. But they were set against cumulative odds. Details they might change, but the 85 foot plane, its elements and construction system were a sealed closed case; the old entanglements and evils were made a sacred legacy. The Lock-Flights and the Great Dams became the Sisyphean load, which they in passing turn, must roll up the precipitous steep of ever-rising deficits. They might modify, but rescue or redeem. They can but in manful self-sacrifice carry the work along till the awakened country shall call to the great accounting.

This fourth Commission has just submitted its first Report, that of 1907. It is much the best annual review yet made. It is an open and conscientious record. No line is contributed in commendation of the Government Project. The thing "adopted" and imposed is taken with the resignation of discipline. In its creation they had no part. Responsibility for the technique and the foundations is judiciously riveted where it belongs. It is left with the "experts" whose Panama prototype, the Wachusett Dam, in its crucial mass under less than two-thirds the destined duty was sliding away while they were reendorsing their own assurances at the Isthmus.

Execution by contract, though first favored, is in their last analysis opposed. The decision recognizes that no contractor could with this design and method make any notable difference in results. Their verdict in the premises is just. No successful contract is possible. The report adds further the "labor problem is still an unsolved one." There can be no solution with such a plan.
Certain beliefs regarding the Canal have come into extended acceptance and the cymbals of the early French days are tinkling again in our own. The illusion is cherished that for the nearly seventy-two and a half millions of dollars expended or pledged Dec. 31, 1907,—that is, for one-half of the all-inclusive hundred and forty-five millions appropriated—the equivalent of one-sixth of the Canal prism excavation has been made. But this is not so. The ex-Chairman a year ago announced the deepening of the Culebra by 65 feet and the Message of Dec. 1906, gave it support. The "Canal Records" of September, 1907, show that the Culebra Division has not yet been lowered one foot. Its rocky depths are still unpierced.

Considering the mountain-like dams almost untouched, the millions of cubic yards of under-water rock unessayd and unprepared for; the swamp-founded, lake-exposed railway hills unbuilt; the lock pits undug in indurated clay and miasmic morass, and remembering the vast yardage which in and outside the prism at Colon and LaBoca, swelling the welcomed totals, is being brought back by the sea, whose currents wash their tally from the count, not five per cent. in value of the excavation and embankment is permanently done.

The Divide Cut, opened at such cost in money and life by the French, has been widened, and the foot of the ever-advancing slide has been continuously pared. Spoil has been nearly all hauled to nearby dumps, but these deposit areas are now full.

The Report of 1907 says:

"The great problem in the construction of that portion of the canal included in the Culebra Division is the disposal of the excavated material. In the main this has been disposed of at various localities favorably situated with regard to the cut. The systematic performance of the work and the necessity for additional material in completing other parts of the work have made it necessary to arrange for such a disposition in the future as will be most beneficial to the work in its entirety." Ahead now are the long hauls to the huge Gatun and Pacific Dams and Railway fills; ahead are the endless sortings for their sound rock; ahead are the liftings to growing heights of the sixty millions of dead weight tons; ahead are the deepenings, the pumpings, as the Culebra floor gets below the Chagres, and the seasons’ rains gather into its defile; ahead are the saturated, viscous high deposits across the Gatun and Rio Grande swamps; ahead are dragging years and flying millions.

The public believes the past season to have been fecund in
great achievements. The output figures read well. But in these
record months two-fifths of the excavation has been from the
soft silt and sand of the canal approaches. The old French
"dragues" and the hopper dredge, have dug for a dime a yard.
Tens of millions of dollars in buildings and quarters, sanita-
tion and hospitals, tracks, plant, labor, materials and supplies,
administration and Government belong with the other three-
fifths accomplished. The monthly outgo shows twenty-five times
as much expense incident to dry work as to wet. Is there no
logic in favor of a plan which increases the wet percentage?

An impression is abroad that the Gatun Dam is found to
"rest almost everywhere upon the rock." The Gatun Dam is to
rest almost nowhere upon rock. The foundations are alluvial
and artesian. Later borings and test-pits are supposed to tes-
tify to satisfactory rock foundations for the Flights of Locks.
The Report reads: "To actually develop the character of the
foundations on which the locks are to rest five test-pits, each
6 feet by 8 feet, were sunk to the depths of the lock walls at
Gatun, two at Pedro Miguel and one at the Spillway in Gatun
Dam. On completion of the test-pits a Board of Consulting
Engineers" (the Bohio expert, the Wachusutt Dike expert and
his colleague) "made a personal examination of the material.
Under date of May 2, 1907, it reported as follows: 'We beg to
record that we found that all the locks of the dimensions now
proposed will rest upon rock of such a character that should
furnish a safe and stable foundation.'"

The five test pits at Gatun showed character but not extent
and they could not change the permeable sands, gravel and clay
underneath the thin rock blanket pierced as the official profiles
show, at points vital to the locks. Of the test-pits four were in
the upper half of the upper lock, none was in the lower lock
which is all in the morass.

"Since then careful borings have been continued over the
entire area in order to secure a contoured plat of the rock-
surface with a view to the economical adjustment of the locks
to the site" the Report continues.

Here again are the data, the conclusive evidence of certain
facts. By putting the lower approaches and the lower lock all
in the Swamp of Quicksands; by making part of the gates of
the rolling type to save room, against every previous advice
of French and American Boards; by setting in the most dan-
gerous position a futile safety device to conserve the Lake level
in event of gate accident, because there is no other place; by
founding the upper approach piers upon piles in soft ground, the flight has been squeezed onto the pierced rock blanket underlaid by pervious strata, porous and saturated when the lake is filled.

It is supposed also that the Isthmus is sanitized and that a miracle of victory has been won. An analysis of the elaborate statistics from first and last shows the claim to be cruelly and lamentably untrue. The latest available Sanitary Report, that of September, 1907, opens with these words:

"The health conditions of the Zone continue good, as is usual at this time of the year the sick rate is decreasing." What are a few of the conditions attested in the mass of records? The population has been since May, 1906, continuously inflated and the sick and death rates are low only by virtue of this discrepancy. Cheering comparisons are made with French mortality and hospital rates. For the American exhibit a divisor of the "full number on the rolls" is used. The full number is some 40% higher than the "working effectives." For the French exhibit their effectives only are counted. In this very month of September, 1907, nearly 15% or one man in seven of the 4,200 Americans went to the hospital. Over 10% went to sick camps. Of the 7,462 foreign whites—Spaniards, Italians and Greeks—20 3/10% went to the hospitals; over 10% to sick camps and their death rate was six and a half times that of the Americans. Over two-thirds of the hospital entries were of whites, and they received 16,010 dispensary treatments. The hospital rate of the white is six times that of the colored man and his dispensary rate is stated as four times as high. The blacks die five times as fast as the whites, yet marvelously they take sick one-sixth as often! This outlines the sanitary story. Small wonder the labor problem is unsolved.

A latest departure is just announced from Washington "the President has approved the recommendation that a radical change be made in Canal plans. This change consists in the relocation of the dams and locks which it was purposed to place at La Boca. They will now be placed at Miraflores instead."

The valuable Terminal Lake is to be therefore abandoned, the morasses preserved and the tremendous cost of digging through the buried rock ridges of the lower Rio Grande valley in this four mile sea level stretch added to the Canal estimate. To what gain? Military safety it is hinted. With 12 and 14 inch guns shooting comfortably ten miles and more and dirigible
RETRIEVAL AT PANAMA.

No minds, however able or willing, can change the nature of this plan. The one only way of redemption lies in a different canal design, in separate locks, low dams, extended use of water and waterborne plant and a program of synchronous execution. This is the way of all technical, sanitary, executive and financial salvation which can still be secured. It is also the true solution of the labor problem, since it substitutes for a large part of the army of foreign colored and white labor, relatively small forces of skilled Americans.

Before the colossal deficits and the masked evils have shadowed the faith of the American people in their ideal let retrieval come at Panama.
FOREWORD.

The need to America and to the world of the Isthmian waterway is so axiomatic and so imperative that its construction has become a very cornerstone of our national policy. The Panama Canal first, last and altogether has been accepted as the shibboleth of both parties and the motto of a united people. So radical is the necessity for its creation that there would be full warrant for the basic premise, "the canal at any cost." America has passed the stage of a small band of colonies struggling for an Albany post road or a western reserve highway to reach her confines. We have become the nation of nations, with our hands clasping the globe.

The country needs the waterway most pressingly to safeguard the territories under its flag. Whatever may be the divergence of opinion as to the wisdom of becoming possessed of an Oriental domain, one thing is certain—no American would tolerate our being dispossessed of it by violence. If ever we shall choose to give autonomy to the Philippines or bid them godspeed, well; but the suggestion of having them wrested from us would be unwelcome indeed. That we may be able always to reach and defend our dependencies in the far oceans, the Panama Canal must be put through.

Again, we have become the world's greatest producers and are dependent not for a small market but for the range of the whole world's markets. The Orient is the nearest large locus of consumption unpreempted. We must have our share of its give and take. South America is the next new continent lying fallow for commercial quickening. This too, must be drawn to us for mutual fruitfulness.

The recesses of our own land are being all peopled, and the waste places of all lands everywhere are being seized by the strong and brought to human uses. Competition is reaching an intensity and a universality such as Mother Earth has never before felt. The tension is extreme and the bow is being bent more and more to the breaking.

National Defense.—This ubiquitous stirring and general outreaching is not a chance or a passing phenomenon. It is the movement deep down at the base of things, where growth lies and the tremendous outpressures of growth. It is the
activity of numbers increasing steadily. Our globe has become a teeming hive, where swarmings and overflows make ever new demands. These demands are built out of cruel things—wants. Needs in every guise lie at the base of com-petition—the fierce primeval life-needs, whose ultimate arbi-ter at any moment becomes the sword. Would we enjoy the fruits and privileges of our great plenty and our expand-ing good? Then must we be able to defend them at every point against those who lack. He were a fool who, facing a fight, would throw away his sword or his armor, or weaken himself at any mortal part. So a nation which, in this day of an east and a west, strips itself of its might or leaves itself shorn of its fullest power of attack and defense has betrayed the mission of its race; for destiny is still the cruel Roman with her thumb down for the weak. All our interests—industrial, commercial and national—center to the same issues.

By our race right to leadership, therefore, and by our full resolve to hold our people high above the outer pressures, by all that we can be and shall be, we support the Panama Canal, which is an integral link in our capacity and our power.

There is yet another aspect, little moving perhaps to the sphinx holding the highway to the treasury, but still warm, we believe, under the heart of America. Sentiment may not move the mart nor make change on the Rialto, but we own to a lurking misgiving, if it be not after all the secret energy which keeps grinding the slow, sure mills of the gods. The Panama Canal embodies the vision of the seers and the dreams of the prophets through four centuries.

Failure of the French.—It was in 1502 that Columbus, "Admiral of the Sea of Darkness," broken in body and broken in heart, sailed out on his last voyage of desperate retrieval to pierce the legendary strait and redeem his fruitless promise of Cathay. "Porto Bello"—Porto Bello shalt thou ever be to us whose harbor stirred his brief sad gladness. Here was the fancied entrance; here was the narrow way; here opened the passage that was his pawn and pledge. But the Crocodile Chagres was pitiless and the mountains crushed his hope. He sailed away from his new world finding only the last great strait of death. We believe that our Columbia will be glad to have redeemed the promise of Columbus and to have opened at last, in the very gateway where he came seeking it, his way to far Cipango.
FOREWORD.

Through the long after years the search went on. Spain, Portugal, England, the Netherlands, all Europe beat the mid coast up and down on the same bootless quest. Then Cortez, resolute to conquer what obdurate nature had denied, planned to force a strait by way of the turbulent Chagres, and many after him of the hardy Hidalgo stock sought to cleave the continent. But already the great empire was becoming prey to disintegrating forces. Frank and fiercer Saxon were becoming supplanters, and her energies were drawn from the new world back to the defense of the old. And the years of the centuries passed, but the hope never died.

Then, at last, France achieved the great feat of linking the Atlantic and the Indian seas. She had realized, by the east, the dream of the Admiral and had opened the first new way to his Mangi and Cathay. Proud and exultant, this nation, foremost of the race in mighty daring, because foremost in loyalty to ideals, rose to compass the second strait. Her name will ever be linked with that of Panama and, in defiance of all, all, linked in honor. For in the long story of her wars and her glory there is nothing more truly heroic than the legions of her sons storming through ten desperate years the trenches of the rock-ribbed Culebra and battling with the torrents of the ruthless Chagres.

It is because the narrow pass we call the Zone represents the efforts, the hopes, the visions of the pioneers and the prophets of empire for four hundred waiting years, that the land of it is sacred sod, and the water of it shall be the keeping of our elected covenant to all the world. By this thread shall the oceans become one, and the dismembered continent be rebound in a unity her mountains could not bring. This water band, securing to America omnipotence in war, shall be the fillet on her brow of peace.

So to the Panama Canal, life, life and everlasting life! Let no man ever challenge this. But by so solemnly and unreservedly as we do pledge the canal, by so solemnly must we all set ourselves to see that the country gets it. After four centuries of birth pangs the child must not be delivered still-born, or a monster, or a cripple. It must be a goodly, normal man-child, fit for its work of service.

Fundamentals.—There are many forms of enterprise whose fortunes are pivoted upon special expert judgment. Mining is one of these, navigation is another, surgery is a third. The first
indispensable in this expert is the power of rightly diagnosing conditions and elements; the next the power of rightly prescribing or adjusting the elements. As he possesses or does not possess these qualifications the expert is a failure or a success. It counts nothing that he is an amiable gentleman or that he is favored at court. He is the wrong mind for the undertaking, and the loyalty of its friends can be measured in nothing so surely as in their fearless and open elimination of such an one from its destinies. The Panama Canal is an enterprise with its very fulcrum in the right expert judgment and its whole execution at the other end of the lever.

It is the greatest public undertaking of this or any other era. In it are enlisted a vast capital, a nation's pride and honor before the world, and an integral factor of that nation's safety and dominion in case of war. In its every feature and every phase, therefore, it is of supreme concern and should be entrenched within the safest and highest technical citadel.

Business men will appreciate the great handicap under which a venture is brought to the public again after its bankruptcy. When this bankruptcy has been attended with colossal mistakes, deceptions and failures, the public scans the proposition warily and exacts a vouching and a showing which a previous clean record would have averted. The Panama Canal enterprise of M. de Lesseps was the most scandalous bankruptcy of history, not excepting even the South Sea bubble. It had been born in 1879 in the greatest international congress of engineers ever assembled. Some of the foremost authorities living had indorsed its prospectus. The nation poured gold in an ever-mounting stream into the execution, and after nearly ten years of splendid battling, desperate courage and dauntless endurance, combined with hoodwinking, manipulating and blind gambling on the impossible, the enterprise crashed, and the faith and hope of the proudest people in Europe were undone.

Americans Begin the Work.—This story was still warm when we took over the canal project. The linking of the oceans was an idea to stir all aspirant blood, and we were lifted into elation that its achievement had been reserved for America. We buried deep under our feet the skeleton of the sinister past, picked a popular cabinet member for leader, put the project into his immediate personal charge and, under his white plume, pushed valiantly to the front to press the waterway to completion.
The deity at the portal of the old project had been Janus-faced. Aspiration and courage in the many had fronted the world; concealment, guile and subterfuge in the few had backed it. But the few were in the fateful seats, and they weighed the balance down to destruction. It was the malevolent genius which had lured $256,000,000 out of the trusting French populace and had dragged them to the Tartarus of the debacle. We determined one thing absolutely—the deity presiding over our canal would have no Janus faces; there would be no covering of nakedness, no concealment, no juggleries of facts; our temple would have no dome, it would be open to the heavens, and frankness and truth would be its radiant archings. And this was well, for the Panama project was anchored in public confidence and public trust. Its roots were in moral soil and its life force was drawn from the deep well-spring of faith. The people were the friend and the support of the waterway, standing beneath and making it possible, and their confidence could exist only as it was grounded in candor and perfect truth.

The eighty millions of Americans indorsing and paying for the Isthmian waterway were doing so in faith, first, in the technical fitness, efficiency and trustworthiness of the engineers in whose professional verdicts the canal’s destiny was pivoted, and next in the general truthfulness and responsibility of the management executing those verdicts. It expected that the technical decisions when delivered would be safe and worthy and final, and that the direction would be strong and open before the face of men. The one fatal policy which they did not anticipate was that where engineering mistakes were made they were to be condoned and covered; where management mistakes were made they should be disguised and continued. If disappointments loomed straight before, they expected this cabinet leader and his assistant sponsors themselves to announce the facts, that the public might know and prepare for them. They did not bargain to be led on in a full tide of sanguinility straight to the edge, and then be precipitated into the reaction of sudden disclosures.

Facing the Truth.—The advocates of the waterway will seek, of all things, to prevent this. That the public shall know the truth must be their first concern. Had the French people been kept informed at each step of the dubious way regarding the Panama situation there would have been no
debacle and no enforced abandonment of the canal enterprise. Safer and saner counsels could have been called in and the enterprise could have been checked in its reckless course. But it was not, and into the pit went the millions of the French peasantry.

The true friends of the Isthmian project want this canal; they desire that it shall get built. They believe that since this possibility lies in the faith and trust of the public, which must furnish the money, the public must be in possession of the truth, the full truth and nothing but the truth.

The individual most concerned in the success of the Panama enterprise is the President. Of all our national interests it is the one directly started under his administration, the one to which he had given resurrection. Therefore, of all Americans his claim on the Panama Canal is first. That it shall be conducted in honor and be brought to success concerns him vastly beyond any other living man. The President has felt his matchless privilege and its proportioned duty. The Isthmian waterway has been his deepest concern. In the nature of things the project has had to be confided in details to other hands and other minds. Out of their offices he wove his opinion and created his policy. He was not a specialist, so he must depend upon specialists for the crucial judgments; he was not a constructor, he must depend upon executives for canal building. He picked his adjutants and to them intrusted this work—this greatest public achievement ever assayed by man.

How have they served the American people and the American President? Are they giving trustworthy engineering to found their waterway upon? Are they giving wise methods to execute it upon? Are they giving right costs to deliver it upon? Let it be known.
CHAPTER I.

FINANCES—DEFICITS.

The first factor of the Panama situation which shall be brought to the balance for the weighing is the finance.

This is gauged, in the main text, as of January 1, 1907, and is brought to November 1 of this year by supplementary insertions where pertinent. The intervening ten months have but verified and accentuated the conservatism of the conclusions.

Congress has appropriated for the waterway $145,000,000. The official estimate for the 85-foot six-lock project was roundly $140,000,000 exclusive of Sanitation and Zone Government. Of this Jan. 1, 1907, $40,000,000 have been expended, and the call has been issued a second time for $25,500,000. With $25,500,000 as the yearly rate of call, eighteen months later but $67,000,000 will be left to call. This must serve the entire expenses during the nearly seven years then remaining of the estimated construction time. It is, therefore, self-evident, mathematically that were the rate, when the work is in full swing, never above the past annual rate of call, the deficit would still amount to more than $100,000,000. A hundred millions of deficit in straight sight, and the work still only in the stage of preparation! Has one word been spoken by those in authority of deficits? Has not everything regarding the canal been reported with the highest approval and optimism?

This sum of a hundred millions is based upon a rate of money demand on Congress supposedly no greater than that obtaining in the past. If this rate is increased (as it has been in September, 1907, by eight millions), manifestly the deficits must increase also. There has been an impenetrable silence regarding the finances and an enigmatical cross-firing regarding the technique, but much heralding of what "we are about to do." So the bases for certain estimates are at hand, and we can roughly outline some of the accretions for the deficits. The amounts will be significantly gauged or forshadowed as the import and content of each element is revealed.

The Commission report gave 25,000 men on the payroll in the spring of 1906. On his return from the Isthmus in the autumn, the chairman stated the number as around 30,000 then. The message of December, 1906, put the average force for the last ten months as 26,680, and officially announced that 25,000
additional were to be put on. The labor contingent was to be therefore, at least doubled.

Men, to live, must have quarters, barracks, messes, hospitals and all the addenda which go with living. It has taken three years and a goodly share of the expended $40,000,000 to provide the varied quarterings for the 25,000 or 30,000 men installed in 1906. The official "Canal Record" of October 16, 1907, publishes Col. Gorgas' Report. It states "slightly over 41,000 appeared on the rolls of the Commission in September, 1907, against 28,000 the year previous." The full labor roll is used in American health statistics. The Chairman reports that September 30th, 1907, there were working, 29,845. This is the factor of "effectives" used as the French basis of health statistics. During the month, 783 were brought to the Isthmus. Some 26 per cent. were therefore on the rolls but not working. How much more time and money must be consumed, to house, hospital and equip for duty a duplication of the 1906 force? We had at our beginning a number of residences, barracks, hospitals, stables, hotels, etc., which had come to us from the French, and which needed but a partial expenditure for restoration. Ancon Hospital, costing over $1,000,000, is still our chief dispensary; Colon and Toboga still supplement it. The Administration building does service; Cristobal bears testimony to past fitness, and the Folies Dingler redeem their name to honor. Upward of 2,000 buildings were taken over. These have all been credits, keeping down the costs of providing for the first 25,000. The best and costliest of those buildings are occupied. The second contingent's provision must be built more largely, de novo; hence the cost must be increased in an amount represented by the lesser utilization of the French purchase.

Some addition to the $100,000,000 of deficit, therefore, lies over against the domiciling, the mess quartering, the hospitalizing, etc., of the 25,000 additional men that the message stated were to be employed.

The second addition to the deficit is the further wage account. The labor roll, inclusive of the wage roll of the Panama Railroad on improvements for canal service, January, 1907, is approximately $1,000,000 a month. Thirty-five miles of the Panama Railroad are to be removed and rebuilt upon higher ground, so the collateral expenses of the railroad continue. Nearly twenty per cent. of all the employes at the Isthmus are in the service of the Panama Railroad. One million a month is $12,000,000 a year, and $96,000,000 for the eight years of esti-
mated construction. Ninety-six million dollars must be provided in wage for one-half of the labor force which is to be engaged—and $40,000,000 out of the estimated $140,000,000 gone already! Deducting the wage for the 1906 contingent during eight years, there is left of the estimated fund the munificent sum of $4,000,000 to pay for material and supplies and everything else needed to construct the canal.

If January, 1907, the force is to be doubled in order to complete it in eight years, the wage factor must rise accordingly. Doubling the labor roll must somewhere approximately double the wage item, and $96,000,000 must become $192,000,000.

One hundred and ninety-two million dollars are to be paid out in wage alone, if 50,000 men are to be at work in Panama—$192,000,000 for the eight estimated years. The Sanitary Reports give the total number of employees in July, 1907, as 38,298 in August, as 40,443, in September over 41,000. So the contingent is well on towards its doubling which must come when locks and dams are under construction. Has the Secretary of War invited the attention of the American people to the deficits involved in the payrolls? It is the Government's 85-ft. project, executed by the Government's selected method, that is calling for such excessive numbers at Panama. One group of its engineers advocated another type of canal—a sea level, to be executed after the self-same manner. It had twice as much digging to be achieved, and twice as many men to be impressed, or twice as long a time to be given for execution. America, in gratitude for escaping Scylla, ought perhaps to be willing to dash upon Charybdis, but there was to have been no Charybdis.

It was safe sailing in an open sea that was promised, and $140,000,000 was to cover the voyage. Has the Secretary of War, who had Congress so carefully instructed as to the facts of the vast labor force, the stupendous cost and the long years of delay inevitable to the sea level—has he done the same by the 85-ft. design?

The total prism excavation, allowing grace of official measurement, was to November 1, 1907, 14,376,677 cu. yds. and about 69½ millions of money had been disbursed on vouchers and pledged for unvouchered commitments, aside from the 50-million purchase price.

The French in ten years at a cost of 256 millions achieved 2½ of their small waterway; we in four years (Nov. 1907) have achieved one-ninth of our very much larger waterway. Excavation alone has been thus far undertaken and excavation in the
upper easier formations; the underwater rock, the masonries and the dams are unessayad.

This 47 miles of Isthmus has taken, November 1st, 1907, over $335,000,000 of French and American capital or the appalling average of $7,000,000 per mile. By July, 1908, the American expenditure will equal half that of the French and our work is but fairly begun.

The fundamental theory of this 85-ft. canal and its execution will break the nation's treasury sorely on the wheel, if it be not broken itself first. The root of the Panama problem lies here—is land dominion or water dominion the goal in a waterway? Shall the land width to be dug and conquered be the greatest or the least possible? Shall water sovereignty be established at the latest or the earliest possible?

There is a way, simple, natural, cheap. Under it, by the building of three low dykes, no higher than those that impound the reservoir of Central Park; in one year, and at a cost of less than $1,000,000, the land width of the Isthmus can be reduced from the present forty-seven miles to less than sixteen miles. Forty-seven miles to sixteen miles—the distance narrowed to one-third. Would not this auger a living chance for the canal? Would not this hold some valid promise and some possibility of cut costs and cut forces? A year later, by impounding but fifteen feet of water at Gatun, the land width can be reduced to the distance between Pedro-Miguel and Obispo—around seven miles. Forty-seven miles in two years reduced to seven, the land width cut to approximately one-seventh—the problems, the expenditures, the execution confined to this narrow pass between the hemming waters, what rescue and salvation does it not guarantee? A small force at Mindi, Gatun, Pedro-Miguel and Sosa, building the single isolated locks and low dykes, these would represent the whole canal construction outside the defile. And for it an advancing water platform would secure to the construction that ideal of execution here, the minimum of land plant and the maximum of water-borne machines. Are not the simplifying and the elimination which this system supplies self evident?
CHAPTER II.

PREPAREDNESS.

Next in the count of additional deficits comes the question of preparedness. The special message announces the close of the long preliminary period and the entrance upon the second epoch—that of execution.

The vast expenditures of the three first years have been justified always on the plea of preliminary outlay: "Getting ready, getting rightly and fully ready." This plea has been the laconic vindication set like a stone wall against every question. Now the incubating has been fruitful, and the announcement is made officially that the preliminary phase is at last over and that we enter the second stage—that of actual execution. To the Senate probings the same explanations were tersely vouchsafed—the great outlays were warranted; they were made once and for all; they were a finality, hence it were wise that they were made fully and well. But this was of the past, the large investment was closed and supplies were in hand to push the work at white heat to achievement. These claims were reiterated as recently as last December, in the opening paragraph of the Commission's report. It reads:

"During the year the first stage of the canal work, that of preparation, has virtually been passed, and the Commission finds itself in a position to enter upon the second stage, that of actual construction of a lock canal at an elevation of eighty-five feet, authorized by Congress June last.

Emphatic testimony to the thoroughness with which the preliminary work has been done was borne by the Senate Committee on Interoceanic Canals in its majority report, made to the Senate on May 17, 1906, after an investigation which extended over a period of six months and included every detail of the work and every act of the canal officials. In that report the Committee said:

The work authorized by the Spooner act has been initiated, and extensive preparations for a rapid prosecution of it have been made. The Canal Zone has been placed in a satisfactory sanitary condition, adequate shelter for the workmen has been provided, hospitals of very large capacity have been made ready, as is evidenced by the opinions of experts who have testified before the Committee, and we are fortunately now in possession of a vast array of figures affecting the prosecution of the undertaking that have not until now been available. This is due to the fact that the preparatory work has for two years been prosecuted with patient, intelligent judgment and earnest effort by those intrusted with the direction and supervision of the work."

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Let us examine these statements that the Secretary's trusted subordinates published in their most authoritative public record—the report—and which they have put into the mouth of the Executive, and, sponsoring which, they allowed him to go before the country in a message. Had the Secretary of War no responsibility here, or the chairman, or the Commission? What kind of facts have they given him? The claims will be analyzed. If they shall prove to be as deluding as they are deplorably untrue, will the judge deem the equivocation accidental or deliberate? The 1906 report of the Isthmian Canal Commission is signed by the chairman only. His colleagues were, under the authority of Congress, coequal, but they are ignored; he signs alone. The Chief Engineer and the Governor are allowed appendices, a sort of codicil to the will, that is all. The statements of this preamble must, however, have had the approval of the chairman's colleagues, since they are silent. They had the sanction of the Secretary of War, since he does not correct their allegations and assumptions; they had the indorsement of the then Chief Engineer, since we heard no voice in protest.

Has the "first stage" in canal work been "virtually passed"? Are plant and equipment enough, or anywhere nearly enough, provided for executing the work? Begin on the Atlantic end. There are on hand January 1, 1907 two dredges, both patched-up relics from the jetsam of twenty years ago. There are on order:

For Colon—Two dipper dredges, neither of which can reach the 45-ft. depth planned. One has been a year and a half building and is not yet ready; the other is just ordered and will be at work in another year—perhaps. There is on order a self-loading hopper suction dredge, which may be ready to begin operations in eight or nine months. (It began as reckoned in September, 1907). It cannot discharge its hopper contents ashore, nor work in the upper half of Limon Bay, because the material there is too light to remain in the hoppers and will flow overboard about as fast as it is drawn up by aspiration and discharged. Besides, the upper half of the bay, unprotected by breakwaters, is too rough from the constant on-shore trade winds for such a vessel to be safely operated.

The chairman, January, 1907, proposes to order two smooth-water suction dredges. These may be delivered, if on contract time, around March, 1908, some months hence.

This is the status upon which the chairman reassuringly announces that the Commission "finds itself ready" to excavate
the Atlantic terminus. Is it ready? Is this all it intends to order? How, then, is it proposed to drill and blast and lift and distribute the unknown and misreckoned millions of cubic yards of indurated clay-rock between Mindi and Gatun? Has it any drill-boats, any modern rock breakers, anywhere, or on order? No, not one. Enough to meet the requirements of this 85-ft. scheme will cost a million of dollars and will take from a year to eighteen months to build, equip, install and organize. The clay-rock will have to be stripped of 20 to 30 ft. of overlying swamp, and there is no dredge or other machinery there to attempt it, or likely to even start before the spring of 1908.

Is, then, the first stage of preparation for the harbor entrance—or the three-mile approach channel to Gatun passed? Evidently not. The curtain is not yet rung up; the scenery is not even in place.

Next we survey the narrow, hog-back ridge whereon is to be perched the mile-and-a-quarter-long double staircase of three great concrete locks. Where are the locomotive and cantilever cranes, the forest of derricks, the compressor, drill and channeling plant, the power station, the excavating mechanism, the spoil distributing devices? Where the cement works or the crushers, the screens, the mixers, the conveyors, the tracks and all the vast array of mechanism needing another million dollars or more to get ready to excavate for and build these locks? If these accessories were all thought out and on order to-day they would take, for installation, over a year.

The “Canal Record” of September 18, 1907, states that the preliminary studies of methods here have not yet been completed—let alone approved.

Next, the plant wherewith to build the mountain of the Gatun dam—where is it? Where are the fleets of barges, tugs and quarter boats to transport the spoil to Gatun? Where are the relay stations, the engines, pumps and pipes to force to untired heights and rehandle 30,000,000 tons of dredgings, as the minority supported by the Commission propose? The Lake Superior ore is not dug to make the pig iron for the castings, and the machine is not invented. Where are the trestles or the tracks from which to dump the millions of tons of rock from Culebra to make the ridge-like toes of the dam? Where are the machines to excavate the spillway site or open the old French canal, dig the laterals and clean
PREPAREDNESS.

Union to run them, and, in combat with the rain, the mud, the heat and tropic environment, the machines do one-fifth as much as they would do in northern latitudes. A claim has been made of as much as 10,000 cu. yds. per month for the average of Culebra output in 1906. The steam shovels in the Culebra are doubtless very impressive—when they work. The French left some imposing results and toy plant—we have some imposing plant and toy results.

Next we pass to the Pedro Miguel and Sosa staircase of the locks. Where are their derricks and cranes, crushers and grinders and mixers? Again, not even ordered, and the plant will require a million and a half dollars and will demand fifteen months of time.

Where are the equipments, the dredges and the plant to build here the lordly dams, containing over 12,000,000 cu. yds., whose material is to be lifted over 80 ft. and whose volume equals four of the greatest of Egypt's pyramids?

Last, we view the readiness in Panama Bay. The old French dredge that has been fighting the endless deposit of sand from littoral drift, for years trying to keep open access to the La Boca pier, will now enter its "second stage," and in a year or so the one hopper machine ordered will round Cape Horn and come to bear it company, as will the other dipper dredge that at high tide will not come within 20 ft. of touching bottom. This is preparedness at Panama! How many unreckoned millions are to be still expended for adequate preparation?

(The foregoing chapter was written in January, 1907. Ten months later, November 1, 1907, the excavating plant has been augmented by rehabilitating two old French dredges for the Colon Division and one for La Boca. Twenty-two more steam shovels are on order in addition to the 1906 complement of sixty-three.

The increased output during last half of 1907, gratifying as it will be generally regarded, is almost wholly due to bringing the dredge fleet into service and employing it on the resilted portions of the old French cuttings and the easiest digging in the approaches at Colon and La Boca—where a limited amount of soft material makes a large but illusive showing of valuable achievement.)
CHAPTER III.
DEFICITS SUBMERGED IN MATERIAL AND SUPPLIES.

Further addition to the hundred millions of deficits are submerged in “Material and Supplies.” What expenditure is probably involved in these items? There are two sources for getting a lead here. One is the cost to the French of “materiel” on their much smaller canal; the other the cost of materials and supplies to the Commission on their own project thus far.

It must be prefaced regarding the French that the type toward which they were hewing in these earlier years was a sea level, and their problem embraced excavation almost exclusively, not the material and supplies incident to the great locks, gigantic dams, etc. It must be further prefaced regarding the Americans that the “materials” needed for incorporation into structures (except as to quarters for men) during the first years have been slight, because there has been almost no canal construction. Permanent docks, locks, dams, spillways, etc., have been hardly even started. The past call, therefore, cannot be considered more than an intimation of what must be the demand in the coming time, as the construction runs its course. Excavation has been thus far the only canal work undertaken, and excavation in the upper strata; the submerged rock, the indurated clay-rock, the masonries of locks and dams—these all await the future. The work is still scarcely begun. Its preliminary expenses give, therefore, but a herald of what will be needed when execution is at the great flood tide, imperative, if the waterway on this plan and with these methods is to be completed in eight more years.

The report of M. Flory to the French Chambers (page 58, Panama Rapport), under “Material et habitations a fournir par le Compagnie” gives the French pace.

The French management furnished the plant, houses, barracks, repair shops, hospitals, etc. The first two years were to be the “period of preparation” and the second was styled the “period of execution.” The price of work in the Couvreux and Hersent contract, the first and lowest one made, was to be determined under a special committee, which should decide unit costs. During the organization period Couvreux and Hersent were to have 6%. A limit of $102,400,000 was then accepted by them as an overhead figure for their part in executing
the Canal, and this amount was allocated to the work by the French company. When they renounced their contract, others were made—over a hundred, great and small, in which the corporation undertook what M. Flory recounts.

What was the actual yearly outlay of the company to meet its part in the obligation on the small channel, involving no great masonry locks and spillways? He writes: "The Panama Company was obligated to furnish to each contractor the important (major) plant, also the houses, barracks, etc. These engagements were made, it may be said en passant the origin of such incessant claims on the part of the contractors and claims of such great amounts that in case of completion of the works it is not practicable to fix upon what would have been its actual probable expense. We have not been able to ascertain the sums really paid for the same items before the month of July, 1886, but after that they are as follows" (5 francs equal $1.00):

"In the course of 1886-1887, $2,916,138, one year.
In the course of 1887-1888, $4,115,236, one year."

It has been taken for granted, in the great complacency, that we would do better, but the latest Isthmian report gives actual figures. One finds that in this, as in nearly everything else the 1906 Commission has gone the gait. Reproaching the extravagant French, they have outdone them four-fold.

Material and supplies have been bought already to such a sum that the outlay is over $800,000 a mile to be dug (October 1, 1907 it has mounted to $1,100,000 a mile to be dug)—and quantities of plant, lock and dam materials, mechanisms and supplies remain yet to be provided, before the stage of preparation can be at all reckoned as passed. As to certain important costly elements, it is not even begun. If the State of New York had bought material and supplies at only the past Panama rates for its barge canal, the getting ready would have required to-day nearly twice the whole $101,000,000 which its entire work is to cost. This Barge Canal is ten times as long as the Isthmian waterway. It extends from Albany to Buffalo, with branches. Twenty millions in contracts have been awarded at 10 per cent less than the engineer's estimates. It is to have some twenty-six locks. The 85-foot Panama project builds six. The Isthmian Commission had ordered or expended at the beginning of 1907 $20,000,000 for material, supplies and plant, and this sum is but the dipping of the flag. The horses are only off. October,
1907, these expenditures and commitments total over $30,000,000.

An analysis of the Isthmian report discloses that prior to April, 1905, the actual disbursements for material and supplies were not large, though some orders had been given. The Walker Commission was in power, and Mr. Wallace was Chief Engineer. But the pace was deemed too slow, and the next Chairman was called to the "free hand." The free hand was a full hand and no questions asked. Wholesale requisitions really began in the administration of the Executive Committee starting April 3, 1905. In July, 1905, Chief Engineer Stevens was inducted into office. It is, therefore, apparent where the primary responsibility lies. When he took hold there had already come a complete congestion of the wharves of Colon with the material and supplies already purchased. In his testimony before the Senate Committee he gave a vivid picture of the resulting conditions. He stated that 3,000 cases without names or apparent destination were gathered on the Isthmus and were forwarded by steamer lines down along the Pacific Coast in an endeavor to find consignees. After herculean efforts, the boxes and cases remaining were distributed along the Zone, and in some instances in warehouses erected especially for their reception. The largest of these was at Mount Hope, and it was a suggestive location in view of the character of certain of the purchases. In the spring of 1907 this warehouse with its contents charitably burned.

When the Burlington & Quincy took over a railway which it acquired in 1878 an inventory of the tickets and stationery laid in by the general passenger agent showed that the stock was sufficient for 324 years. Since this principle was found to have gone through all its administration, it is small wonder that the road went into bankruptcy.

From July 1, 1905, when the late Chief Engineer took hold, until June 30, 1906, to quote only one year, there were continuously employed in the department of material and supplies a very large working force, as per the following schedule:

July 1905, 1,750; August, 1,636; September, 2,107; October, 2,381; November, 1,831; December, 1,443; January, 1906, 1,585; February, 1,493; March, 1,670; April, 1,303; May, 1,356; June, 1,356.

During this period from 8 per cent to over 16 per cent of the mean number of canal employees working were used to receive, store and reship the immense quantities of ma-
terial, etc., arriving at the Isthmus, out of the $20,000,000 worth paid for and on order. It would take months of expert work to go through these purchases and separate those really needed from those not needed. An analysis has been made of but a few of the requisitions issued, ordered and filled. A river of money has run under the bridge and huge sums have gone into materials whose real value to the project is a fit subject for investigation. We instance some of these only, and ask if these are typical of the requisitions sanctioned:

Serial No. 207 of April 15, 1905, bids for which were opened May 12, 1905, in class 12, a requisition for 104,000 pairs of butt hinges, and again in Serial No. 289 of November 20, 1905, bids for which were opened December 8, 1905, we find in class 28 nearly 84,000 pairs more of the same article, making a total of 188,000 pairs. There were also purchased on open purchase requisition by the New York agent of the Canal Commission prior to April 15, 1905, about 60,000 other pairs of T-buts and strap hinges.

One pair of hinges is all that is necessary to one door, so that provision has been made for about 250,000 doors. This is a devotion truly to the open door—to 250,000 of them.

Again in Serial No. 289, as above mentioned, hinges were specified as "bronze plate on steel." The difference in cost between these and the plain steel for the quantity specified is approximately $5,000. A costly indulgence!

Examination of the report of the Chief Engineer for 1906 shows that 1,018 of the old French buildings have been repaired and that 204 new ones have been constructed, a total of 1,222 buildings. Among all our literary friends writing with such intimacy of the Isthmian Canal, none of them have remarked that each house has on the average two hundred doors. July, 1907, there were 2,919 buildings of which 1,270 are repaired French structures, 678 such buildings remain to be repaired, 971 are new. All this has cost $8,355,837. There were October 2, 1907, so the official organ states, 652 painters at work, who in one year used 530 tons of "lead" alone. One man in fifty at the Isthmus is a painter.

In Serial No. 207, class 11, of the same dates as above, there are called for 117,500 steel set-screws in quantities of 2,500 of each size from three-eighths to one inch in diameter, and also 130,000 hexagon cap-screws, in all sizes from one-fourth to one inch in diameter. Such a stock of
DEFICITS—MATERIALS AND SUPPLIES. 31

set and cap screws could not be found in any factory or warehouse in this country. In fact, many of the sizes have had to be made up especially.

Exactly what use there could be for such a quantity of this material it is hard to imagine, especially as there is very little machinery indeed being built on the Isthmus.

In Serial No. 216 of April 19, bids for which were opened on May 17, 1905, we find specified in all 100 rail saw machines of the Bryant type. These are small machines operated by hand power, using circular cold-cutting saws. They are needed by section gangs and track layers. This number would allow two machines a mile on the Panama Railroad. The great railroad systems of the United States do not ordinarily have more than one machine of this type to every third section of five or ten miles. The approximate cost of this purchase was $10,000, over ten times what the usual practice would have warranted.

In the same Series No. 216, in class No. 28, were specified 70,992 files. These were of all kinds, including different shapes and cuts. They took in practically the entire list from beginning to end. The quantities on the items specified were away out of proportion to any commercial practice, as the same quantity of all lengths were ordered. Ordinarily where 100 dozen of 10, 12 and 14-inch files are specified, twenty-five dozen of 4 and 6-inch are ordered and ten dozen of 18-inch, and usually a larger quantity of 8-inch than of any other. The enormous size of this and other file orders makes one wonder what unwonted office files are to serve on the Isthmus.

Three orders called for 19,900 faucets; another group of requisitions for 5,076 rakes, 59,276 locks, 14,420 more hinges; 6,000 rubber valves and 16,000 metallic valves of every size, still another group called for 709,620 bolts, 854,300 pounds of nails, 3,521,312 screws, 326,876 rivets, 2,338 pulley blocks.

Then there were handsaws, thousands and thousands and still more thousands of handsaws, 26 inches long, and thousands upon thousands of hammers and extra handles and wrenches; and every other item that is listed in the great catalogues (some of them a thousand pages long) which are issued by the manufacturers and supply concerns all over the country.

While it is not now maintained that any article except the steamers has been bought at a price higher than should
have been paid for it, nevertheless to purchase numberless things that cannot be required or used is just as censurable. The Isthmus is the land of rain and rust, and every rod bears testimony to the rapid destruction which nature herself effects. The administration of the French company should have been lesson enough on this. It bought stupendous quantities of plant and material, which were sent to the Isthmus and were never used, and never could be used and never were wanted. The Panama Canal can have no enemies more real than men who make and men who sanction wholesale purchases of materials which are not needed, or which are not adapted to or wanted in its construction:

The chairman continues in the 1906 report as follows:

“The total stock of materials and supplies on hand June 30, 1906, in charge of the division of material and supplies, which have been purchased since the United States took charge of the work on the Isthmus amounted to approximately $1,400,000. During the month of June, 1906, the division of material and supplies disbursed materials to the various departments to the value of more than $1,200,000, from which it will be seen that taking that month as a basis there was on hand on June 30, 1906, in charge of the division of material and supplies an average of only about thirty-five days' supply of materials.”

Here then we have the authoritative American gauge before the second stage is begun, $1,200,000 monthly. There are immense quantities of raw materials, cement, sand, steel, etc., not yet supplied and to be required for locks and dams and spillways. At this given rate, presumably six months later $7,200,000 have been issued. If in the eight fat years of the “second stage, that of actual construction,” this past rate, which this Chairman himself assigns, were maintained, he would expend for “material and supplies” for the Panama Canal $115,200,000 more.

It is necessary to incorporate some statistics taken from exhibits of this last Isthmian Report, in order to see what the preparation such as it is has been in relation to the purchases of the Commission. This is a guide to their presentation of the actual status, and it is one measure of their work under the direction of the Secretary of War.

The items are segregated from the mass in which they lie obscurely buried.
RETRIEVAL AT PANAMA.

Against the current assets of September 30 there stands:
Liabilities per exhibit D (p. 12) $1,234,856.27 and unvouchedered accounts to an amount unknown, and not reported anywhere.

If we take the June 30 report as a guide, it is probable that the net assets on September 30 were about $20,000,000 and the financial exhibit was roundly as follows:
Material and supplies paid for or on order........$20,000,000.00
All other items .................................. 12,288,216.00
Net assets September 30, 1906 (of which $5,000,-
000 or more is spent January 1, 1907)......... 21,211,784.00
Total .............................................$53,500,000.00

Of these sums, of the $32,300,000 of money paid out, or obligations taken to September 30, 1906, there is charged to the canal construction (p. 125) for the fifteen months ending September 30 but $3,099,537.50. Of this there is charged to excavation only $1,233,430.86. This is considerably worse than the French proportion, and the ratio of "work done" to "money expended" in their schedules was the handwriting on the wall. The total outlay for actual canal construction since our beginning is $3,793,839.83. It is amazing, this—but we are quoting the report, and the Chairman of 1906 is the voucher.

During the last fiscal year (1907) the monthly disbursements of the Division of Material and Supplies has been $750,000 or $9.4 millions. At this rate the coming eight years would consume $76,000,000.

From Numbers 1 and 2 of the "Canal Record" the following table is derived showing the directions of the various expenditures for the first six months of 1907.

<table>
<thead>
<tr>
<th>Item</th>
<th>Jan. 1, 1906</th>
<th>July 1, 1907</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitation and Zone Government</td>
<td>$4,381,088.80</td>
<td>$5,791,457.03</td>
</tr>
<tr>
<td>Construction and Engineering</td>
<td>9,729,554.98</td>
<td>15,594,354.17</td>
</tr>
<tr>
<td>(Buildings,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8,255,837)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant</td>
<td>12,138,852.17</td>
<td>18,484,390.74</td>
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<tr>
<td>Material and Supplies</td>
<td>3,449,022.96</td>
<td>3,649,655.13</td>
</tr>
<tr>
<td>Loans to Panama R. R.</td>
<td>765,480.00</td>
<td>1,631,257.34</td>
</tr>
<tr>
<td>Advances to Panama R. R.</td>
<td>1,683,646.90</td>
<td>1,826,683.50</td>
</tr>
<tr>
<td>Due from Individuals and Companies,</td>
<td>1,020,008.72</td>
<td>1,950,952.28</td>
</tr>
</tbody>
</table>
DEFICITS—MATERIALS AND SUPPLIES.

July, 1907.

Receipts. | Expenses.
---|---
Revenues and Appropriations........ $102,662,295.77 | $100,489,816.11
Due I. C. C......................... 716,976.36
Unpaid June Pay Rolls, etc........... 3,252,655.11

Total Receipts: $103,379,272.13 | Total Expenses: $103,742,471.22

Deficit June 30, 1907................. $363,190.09
Cash Assets ......................... $2,172,479.66
Pay Roll unpaid...................... 3,252,655.11

This exhibit discloses that Sanitation and Zone Government in six months cost $1,410,367.23. In eight years this item at such a rate will total 22½ millions.

For Construction and Engineering the six months' total is $5,865,479.19 and for Plant, $6,345,448.57.

Not a line tells of the "unvouched accounts" June 30, 1907, but they were $7,750,000 January 1, 1907.

There was, June 30, 1907, exclusive of such engagements, a bookkeeping deficit of $363,190.09, but the payrolls were $3,252,655.11 and the amount of previous revenues and appropriations left was but $2,172,479.66—a real deficiency of over a million dollars which must have been drawn from the appropriation of this fiscal year.

The operations of the imperium in imperio afforded by the retention of the corporate form of the Panama Railroad, are indicated in the "loans" and "advances" totaling June 30, 1907, nearly 3½ millions. Besides this, two millions were "due" from individuals and companies mostly the "railroad and other interests engaged in allied work," an increase of nearly a million in this item in six months.

On the 18th of August, 1907, the Chairman and Chief Engineer requisitioned from the President four extra millions for labor and four more for material beyond the grant of Congress. This makes a total for the year ending June 30, 1908, of over 35 millions and leaves but 57½ millions of the original estimate to finish the canal. If this latest demand be the rate of call for even eight years the requirements are over 280 millions more and the deficit in sight mounts to 22½ millions aside from interest and delays and uncounted items.

If the 85-ft. canal can make but this showing what would have been the record before the sea level excavation had been achieved?

Has the Secretary, or the Chairman, or the Chief Engineer, or the Commission given any warning of the great additions to the deficits submerged in "materials and supplies?"
CHAPTER IV.

TIME OF EXECUTION.

The next element of accretion to the deficits is involved in "Time of Execution." Nine years from January, 1906, were given for the 85-ft. Canal; one year passed and a dash for the pole began the first of the month of January, 1907. When we allow the amplitude of eight years, ships are to pass the Isthmus December 31, 1914.

A former chapter set forth the condition of utter unpreparedness, which has rung out the old of the "preliminary" and rung in the new of the "actual execution." The plant on hand at the Isthmus has been detailed—it consisted virtually in mid-November, 1906, of fifty-two steam shovels. Of those which in the three years had been erected in the shops at Empire, twenty-six only were in place at Culebra. Two were at Gatun and one was at Pedro Miguel. On incident collateral work, one was at Mindi and one at Mirafores. The rest, twenty-one, were still in the erecting and the repair shops. These thirty-one shovels, together with the engines and tracks to serve them, and three very small dredges, represented the plant in place ready to work. Of the sixty-one shovels ordered (report of 1905), nine were erected in 1905, thirty in 1906. From June 30 to November 16, 1906, four and a half months, thirteen only were put together, making fifty-two in all. In July, 1907, there were 63 shovels on the Isthmus, 39 on the average were, in September, operating on Culebra Division. Some are engaged in collateral work, such as preparing the roadbed for tracks incident to the transport of material. Twenty-two more are reported on order for gradual delivery. There remains still an allied project whose vast scope is little realized. The Panama Railroad for a distance of thirty-five miles is to be abandoned and a substitute line is to be built high up the canyoned slopes. "The construction of the Canal will necessitate building thirty-five miles of new road at an estimated further cost of $3,700,000. It is thought that not a dollar of this can be saved, though when the Canal is finished the railroad will probably be almost useless." Thus epitomizes one of the "85-ft." advocates. "Not a dollar of it can be saved!" It is all part and parcel of the needlessly high-level Canal and the superfluous sacrifices it entails. But this is another story. The utter inadequacy of
the $3,700,000 is also a matter for later analysis. It is sufficient to point out here that this vast work is planned to be done and that steam shovels will be impressed in its new cuttings. One fill alone in Lake Gatun with stable slopes has the handsome total of between 7,000,000 and 10,000,000 cubic yards.

All this railroad changing and grading and tracklaying are incident to the 85-ft. design and its execution. But incidental work and its involved plant are aside from Canal digging. The rate of output in the cut depends upon the number of machines available for the cut, not available for something else. To this direct service, therefore, only a proportion can be assigned.

For the water excavation January, 1907, there are on hand ready to work, three small machines—relics of French heritage. Three dipper dredges of American purchase are not yet ready. Further plant is not deliverable for nine to eighteen months.

The increase in output for the year 1907 therefore must be represented by the getting into operation of the three small dipper dredges, one hopper dredge, the steam shovels not demanded by railroad exigencies and a couple of French bucket machines that may still be patched up. The heralded leap from the meager past of 1906, to the bursting future of 1907, when dirt is to be flying all along the line, lies in the employment of small dredges and some more steam shovels with improved transport and efficiency.

Somewhere along in the spring of 1908, the other little dredges ordered will be getting into service, and the pace can quicken, but the Canal cannot be brought by these machines within far hailing distance of the annual rate demanded for an eight-year completion, since not excavation, but lock and dam building determines the time.

The delivery of plant for beginning a real spurt is not even ordered, so the delay of execution is bound to count much time additional at least. Each month’s delay means large further additions to the deficit for obvious reasons.

How much delay in completion is really probable? The rate of output obtaining in the past is not, of course, an adequate gauge or a fit standard for coming things. Far be it from us to augur less of good at Panama than figures at all permit us to hope. The past is instructive only for preventing sanguineness from tripping up the heels of our judgment, and credulity from drugging wisdom. In four years about one-ninth of the mass to be handled for our waterway has
TIME OF EXECUTION.

been achieved. This excavation has been in the easier surface deposits. Nearly 45% of the appropriation has been consumed. The French expended 256 million dollars and completed two-fifths of their small Canal in nearly ten years. We, achieving 11% in four years, are to complete 89% in turn-over of our large Canal and build all the stupendous dams and masonry besides in eight years more.

Unless the two Lake areas, Gatun and Sosa, are to hold back all use of the Canal for at least two years, making the years at their minimum ten, their digging above the planes of 40 and of 10 ft. respectively must be done in the dry. The total amount to be handled in the dry under the 85-ft. plan was some 124,615,000 cu. yds. of excavation and embankment. In 1905 and 1906, 2,742,000 cu. yds. were handled, all to nearby dumps. One million five hundred thousand cubic yards of this was in 1906, and it was wasted, at hand. It is still wasted at the nearby dumps and the difficult deepening is untouched. The Sea Level had about twice the volume of excavation of this high-level plan. For it the same method of execution in the dry was provided and adopted.

The "sea-level" was pledged for twelve years hence! These actualities are cited and these facts set forth as illustrative, not at prophetic. They are noted only because the colossal import of such amounts of excavation and embankment are not at all comprehended by the multitude. It is recognized that the yearly output will be increased. It is, however, one thing to set up a pace on easy work and another thing to maintain it on the hard part remaining. There have been canals built before; some of these were in the temperate zone, where steam shovels attain several times the output obtaining now at the rainy Isthmus. In the cooler clime, men, too, are at a higher degree of efficiency, and proximity to supplies and facilities for transport make rates of execution more rapid. Their records of output must, therefore, from all these causes be taken as a favorable standard of human Canal building. On the Drainage Canal of Chicago the average yearly output is given as 5,000,000 cu. yds. with a force of about 7,000 men. The Isthmian rate for 1907 with a force four to five times as great, may approximate 10 million cu. yds. and such an annual achievement would complete the excavation and embankment in eleven more years. But the deepening of the Culebra and the many million cu. yds. of rock under water to be blasted and dredged and the 45 million cu. yds. to be dug, sorted, transported and lifted into
the great dams and railroad embankments portend another and a longer story.

There is a very general disposition to glorify the present at the expense of the prostrate French. Inefficiency and bad management have been so lavishly and so gratuitously attributed to them, that their actual accomplishments have come to be obscured. The French at Panama, like the Cuirassiers of the Guard in the sunken road at Waterloo, are the fallen soldiers over whom our American army is supposed to be charging to triumph. Let us move softly. The French are not of the battle. Their living and dead have filled the pit over which we should be crossing to victory and we need no "woe to the vanquished!" on our lips.

It is incredible that in the rivalry of laudation for everything and everybody American, such distortion of history and such obliquity to truth should be permitted to prevail. One of the leading New York journals, ordinarily very accurate, says: "The present conditions at Panama are the very reverse to what they were under the French regime. Then the conditions were unspeakable and a reign of terror existed. All that has been changed."

"A reign of terror," measured in the greatest rate of achievement in Canal building ever attained anywhere in the world! Have we no saving sense, that we set ourselves up where all informed men must smile? The French, the much contemned French with their ridiculed machinery, in Canal excavation, these have overtopped them all.

It is, however, folly to adopt either an 85-ft. design with its stupendous dams and lock-flights, or a sea-level design with its enormous excavation, in face of the French experience, and our own sterile years. They have disclosed indisputably, at the tropical Isthmus, the costs of certain ways and means, and have marked them as things for avoidance. Their retention foredooms the Canal to stupendous deficits, all unnecessary, and postpones to years beyond the time set by the visionaries responsible for them, the date of the Canal's inaugural. If extended time meant only postponement in utilizing the waterway, it would have still serious moment. But delay adds materially and disproportionately to costs and may add seriously to national perils.

One begins to get an insight into the amount of deficits additional likely to accrue through "lengthened term of construction." Has this accretion been pointed out by the Secretary of War, or the Chairman, or the other guardians of the American people?
CHAPTER V.
FINANCES—INTEREST ON EXCESS COSTS.

In the study demonstrating that there were in straight view very large deficits to cover the construction of the 85-ft. lock project, with all that its design involves, no account was taken of a further item—i.e., the load placed upon the coming generation for interest on the bonds which must be voted by some Congress to pay the excess cost of execution. There must be beyond this, further deficits (and interest thereon) when it is finished, if the capital invested is allowed to run to the great sum for which everything is apparently bound.

In such a world work as the Panama it is the duty of the engineer to point out the best waterway. In this instance it is taken as primary and fundamental that the American people wish and are willing to pay for the best Canal. But the costliest Canal is not at all necessarily the best Canal. This costliest of the lock Canals is a thing of monstrosities and unguardable perils. With the insatiate demand of the 85-ft. scheme right ahead, it is essential to consider the standards of allowable expenditure. These standards are two—the amount fixed by the United States Congress and that calculable as the Canal's value when measured by its practical business utility.

After having thoroughly debated the matter in all its bearings, the legislative branch of the American Government formally dedicated to a Canal at Panama a certain sum. Their judgment as to the business utility of the waterway was recorded in the amount voted for its accomplishment, since by the terms of the law the President was directed to seek another location in event the French vendors exacted too high a price. The amount, therefore, which the Congress of the United States held as a justifiable expenditure is of great significance. Until their action is canceled by subsequent legislation, the amount is fixed and is not to be exceeded.

The authorized cost of an Isthmian Canal may be tabulated as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Authorized Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>For New Panama Canal Co. purchase</td>
<td>$40,000,000</td>
</tr>
<tr>
<td>For Zone Strip purchase</td>
<td>10,000,000</td>
</tr>
<tr>
<td>For Annuity to Panama, beginning 1912</td>
<td>250,000</td>
</tr>
<tr>
<td>For Construction</td>
<td>145,000,000</td>
</tr>
</tbody>
</table>
Appropriation for Construction.
Spooner Act 2% bonds.................. $130,000,000
Cash Appropriations out of Treasury......... 15,000,000

Canal as a Business Investment.—The above, then the legislative statement—offers one very important criterion of allowable expense. A second lies in the Canal's economic value as measured by its practical utility. The natural limit of permissible expenditure is the use the Canal will serve to society as against the sacrifice entailed for constructing it. The closest gauge for defining this is the ratio which will exist between the cost of completing the Canal and its future returns.

Since the Panama is to be used as a highway for the shipping of the world and a net tonnage toll is to be collected for each passage, it follows that the waterway may be rationally analyzed in its business aspect. A forecast can be made as to its probable returns, as an enterprise, with the Federal Government as an investor. So regarded, there are three fundamentals to be considered: Earnings, Operating Cost, Capital Investment.

Earnings.—The earnings may be best calculated from the history of other canals. The figures reached by the Commission of 1901 furnish a just working basis. Their estimate of tonnage for 1914 was 6,843,805 tons. With the decade increment which they derived of 25.1%, the available tonnage in 1917 will amount to 7,279,000 net tons. The tonnage for 1915-16, which represents the beginning of operation, will naturally be less. The actual increase in traffic resulting from the opening of the Canal is taken to begin in 1917. The 1893-1903 Suez decade shows an average increment of 45%, beginning with 7,645,000 tons, and this figure is used for the 1917-1927 decade of the Panama Canal.

The Suez and Panama Canals will also be competitors for a large amount of tonnage, and this condition may reduce the above rate of tonnage increase.

Operating Expense.—The operating expense is estimated by the Commission at $2,000,000 per annum. In this item is included the $250,000 a year due to the Republic of Panama after 1912. So that the Canal as a business investment may be reduced to a definite conception.

The first cost of Canal construction, the French purchase, the purchase of the Zone strip, and preliminary outlays were to be:
FINANCES—INTEREST ON EXCESS COSTS. 43

Capital Required.

Total cost ........................................ $197,000,000
Interest ten years’ construction period, 2%, ten years, $50,000,000 ........................................ 10,000,000
2%, 5 years, $147,000,000 ........................................ 14,700,000
Deficit until earnings meet operation and interest. 12,000,000

Total ........................................ $233,700,000

The time until total expenses will equal income at 4½% increase in ten years, beginning 1917, is two and a half years from 1918 or five and a half years after opening of Canal. It should then be on a self-supporting basis, provided the cost is that authorized by law.

The most usual and obvious factors have been used in making this analysis. The revenue from tonnage toll at $1.00 per net ton is the only source of income considered, and this is a fair position to take. Since the fixed charges and operating expenses will remain constant for the scope of these calculations, regardless of the tonnage passing through the Canal, any increase or decrease in the toll per net ton affects in direct proportion the amount of annual earnings and therefore the amount of the surplus or deficit, and finally the amount of capital that can be advisedly expended on the undertaking. For many reasons such an increase is not desirable. The prodigality of the past Canal management has been shown and besides, great cost is inherent in the physical dispositions of the 85-ft. project. Instead of the capital investment authorized by Congress—reaching roundly $234,000,000, for purchases, construction, interest during construction, and the amount to carry the enterprise until self-supporting—instead of this we are confronted with very much over double the colossal outlay.

We have found that $100,000,000 is but a fraction of the waste to come unless there is a plan and method reform. We have seen the deficit creeping up to over 200 millions, aside from interest, and the interest on this sum for thirty-year bonds is 120 millions, or a total of $320,000,000 in excess.

Ponder what it means, if instead of an issue of $130,000,000 of Panama Canal bonds at 2% for thirty years, say even only $100,000,000 more must be put forth. The interest on this for thirty years is $60,000,000, and the bonds must mature some day, and be paid; then there are the deficits from the inability of the income to meet such vast interest besides the
FINANCES—INTEREST ON EXCESS COSTS.

To-day in the midst of our boasted opulence there is yet not such plethora but that the Pennsylvania delegation begs for a chance to develop the Delaware. Buffalo is petitioning, as is likewise Galveston and scores of other cities. These large sums are unrealizable.

National stringency in any form strikes first at internal improvements. Is there a war, or a falling off in revenues, all items of home development are sliced in the appropriations and our own communities go straightway under curtailment. Three hundred and fifty millions cannot be wasted on Panama without a very marked retrenchment in affairs at home.

If at Panama 300 millions can be saved, let us not boast our teeming treasury and fritter them away. Were all our purpose water channels secured there would be little red school houses a-plenty in need yet in our land. There are hospitals wanted still there at the bottom for those whom our ruthless competition has broken in body, and humaner prisons for the outcasts whom it has broken in soul. "Mistakes," "technical misadventures"—the sophistry of covered disaster and ruthless waste!

Let the public trust be lifted above such things. Let us be glad of our prosperity. Let us stand and dispense our national fund with wise generosity not in the folly of the niggard! Let us lift our heads high to the heavens and keep our eyes straight to the full-orbed day, but dollar for dollar let America build her Canal!