Copyrighted Material

Ocean Steam Navigation and the Ocean Post



Thomas Rainey

Copyrighted Material

The Project Gutenberg eBook of Ocean Steam Navigation and the Ocean Post

This eBook is for the use of anyone anywhere in the United States and most other parts of the world at no cost and with almost no restrictions whatsoever. You may copy it, give it away or re-use it under the terms of the Project Gutenberg License included with this eBook or online at www.gutenberg.org. If you are not located in the United States, you will have to check the laws of the country where you are located before using this eBook.

Title: Ocean Steam Navigation and the Ocean Post

Author: Thomas Rainey

Release date: April 19, 2008 [eBook #25104]

Language: English

Other information and formats: www.gutenberg.org/ebooks/25104

Credits: Produced by Adrian Mastronardi, Chris Logan, The Philatelic
Digital Library Project at http://www.tpdlp.net and the
Online Distributed Proofreading Team at http://www.pgdp.net

*** START OF THE PROJECT GUTENBERG EBOOK OCEAN STEAM NAVIGATION AND THE OCEAN POST ***

OCEAN STEAM NAVIGATION

AND THE

OCEAN POST.

BY THOMAS RAINEY.

NEW-YORK:

D. APPLETON & CO., 346 & 348 BROADWAY.

TRÜBNER & CO.,

PATERNOSTER ROW, LONDON.

1858.

Entered, according to Act of Congress, in the year 1857, by
JOHN GLENN RAINEY,
In the Clerk's Office of the District Court of the United States for the Southern District of New-York.

DEDICATED,

IN TOKEN OF

RESPECT AND ESTEEM,

TO THE

HON. AARON VENABLE BROWN

POST MASTER GENERAL

OF THE

UNITED STATES.

Reprinted 1977
by Eastern Press, Inc.
New Haven, Conn.

Published by
Edward N. Lipson

Distributed by

a Gatherin'
Post Office Box 175
Wynantskill, N.Y. 12198

PREFACE.

In offering to the Government and the public this little volume on Ocean Steam Navigation and the Ocean Post, I am conscious of my inability to present any new views on a subject that has engaged the attention of many of the most gifted statesmen and economists of this country and Europe. There is, however, no work, so far as I am informed, in any country, which treats of Marine Steam Navigation in its commercial, political, economic, social, and diplomatic bearings, or discusses so far the theory and practice of navigation as to develop the cost and difficulties attending high speed on the ocean, or the large expense incurred in a rapid, regular, and reliable transport of the foreign mails.

It has been repeatedly suggested to the undersigned by members of Congress, and particularly by some of the members of the committees on the Post Office and Post Roads in the Senate and House of Representatives, that there was no reliable statement, such as that which I have endeavored to furnish, on the general topics connected with trans-marine steam navigation, to which those not specially informed on the subject, could refer for the settlement of the many disputed points brought before Congress and the Departments. It is represented that there are

many conflicting statements regarding the capabilities of ocean steam; the cost of running vessels; the consumption of fuel; the extent and costliness of repairs; the depreciation of vessels; the cost of navigating them; the attendant incidental expenses; the influence of ocean mails in promoting trade; the wants of commercial communities; the adaptation of the mail vessels to the war service; the rights of private enterprise; and the ability of ocean steamers generally to support themselves on their own receipts.

While this is true, there is no work on this general subject to which persons can refer for the authoritative settlement of any of these points, either absolutely or proximately; and while a simple statement of facts, acknowledged by all steamship-men, may tend to dispel much misapprehension on this interesting subject, it will also be not unprofitable, I trust, to review some of the prominent arguments on which the mail steamship system is based. That system should stand or fall on its own merits or demerits alone; and to be permanent, it must be based on the necessities of the community, and find its support in the common confidence of all classes. I have long considered a wise, liberal, and extended steam mail system vitally essential to the commerce of the country, and to the continued prosperity and power of the American Union. Yet, I am thoroughly satisfied that this very desirable object can never be attained by private enterprise, or otherwise than through the direct pecuniary agency and support of the General Government. The abandonment of our ocean steam mail system is impossible so long as we are an active, enterprising, and commercial people. And so far from the service

becoming self-supporting, it is probable that it will never be materially less expensive than at the present time.

It has been my constant endeavor to give the best class of authorities on all the points of engineering which I have introduced, as that regarding the cost of steam and high mail speed; and to this end I have recently visited England and France, and endeavored to ascertain the practice in those countries, especially in Great Britain.

I desire to return my sincere acknowledgments for many courtesies received from MR. CHARLES ATHERTON, of London, England; ROBERT MURRAY, Esq., Southampton; and Hon. HORATIO KING, of Washington, D. C.

THOMAS RAINEY.

NEW-YORK, *December 9, 1857*.

THE ARGUMENT.

1. *Assumed* (SECTION I.) *that steam mails upon the ocean control the commerce and diplomacy of the world; that they are essential to our commercial and producing country; that we have not established the ocean mail facilities commensurate with our national ability and the demands of our commerce; and that we to-day are largely dependent on, and tributary to our greatest commercial rival, Great Britain, for the postal facilities,*

which should be purely national, American, and under our own exclusive control:

2. *Assumed* (SECTION II.) *that fast ocean mails are exceedingly desirable for our commerce, our defenses, our diplomacy, the management of our squadrons, our national standing, and that they are demanded by our people at large:*
3. *Assumed* (SECTION III.) *that fast steamers alone can furnish rapid transport to the mails; that these steamers can not rely on freights; that sailing vessels will ever carry staple freights at a much lower figure, and sufficiently quickly; that while steam is eminently successful in the coasting trade, it can not possibly be so in the transatlantic freighting business; and that the rapid transit of the mails, and the slower and more deliberate transport of freight is the law of nature:*
4. *Assumed* (SECTION IV.) *that high, adequate mail speed is extremely costly, in the prime construction of vessels, their repairs, and their more numerous employées; that the quantity of fuel consumed is enormous, and ruinous to unaided private enterprise; and that this is clearly proven both by theory and indisputable facts as well as by the concurrent testimony of the ablest writers on ocean steam navigation:*
5. *Assumed* (SECTION V.) *that ocean mail steamers can not live on their own receipts; that neither the latest nor the anticipated improvements in steam shipping promise any change in this fact; that self-support is not likely to be attained by increasing the size of steamers; that the propelling power in fast steamers occupies all of the available space not devoted to passengers and express freight; and that steamers must be fast to do successful mail and profitable passenger service:*
6. *Assumed* (SECTION VI.) *that sailing vessels can not successfully transport the mails; that the propeller can not transport them as rapidly or more cheaply than side-*

wheel vessels; that with any considerable economy of fuel and other running expenses, it is but little faster than the sailing vessel; that to patronize these slow vessels with the mails, the Government would unjustly discriminate against sailing vessels in the transport of freights; that we can not in any sense depend on the vessels of the Navy for the transport of the mails; that individual enterprise can not support fast steamers; and that not even American private enterprise can under any conditions furnish a sufficiently rapid steam mail and passenger marine: then,

7. *Conceded* (SECTION VII.) *that it is the duty of the Government to its people to establish and maintain an extensive, well-organized, and rapid steam mail marine, for the benefit of production, commerce, diplomacy, defenses, the public character, and the general interests of all classes; that our people appreciate the importance of commerce, and are willing to pay for liberal postal facilities; that our trade has greatly suffered for the want of ocean mails; that we have been forced to neglect many profitable branches of industry, and many large fields of effort; and that there is positively no means of gaining and maintaining commercial ascendency except through an ocean steam mail system:*
8. *Conceded* (SECTION VIII.) *that the Government can discharge the clear and unquestionable duty of establishing foreign mail facilities, only by paying liberal prices for the transport of the mails for a long term of years, by creating and sustaining an ocean postal system, by legislating upon it systematically, and by abandoning our slavish dependence upon Great Britain:*
9. *Conceded* (SECTION IX.) *that the British ocean mail system attains greater perfection and extent every year; that instead of becoming self-supporting, it costs the treasury more and more every year; that English statesmen regard its benefits as far outweighing the losses*

to the treasury; that so far from abandoning, they are regularly and systematically increasing it; that it was never regarded by the whole British public with more favor, than at the present time; that it is evidently one of the most enduring institutions of the country; that it necessitates a similar American system; that without it our people are denied the right and privilege of competition; and that we are thus far by no means adequately prepared for that competition, or for our own development.

SECTION X. *notices each of the American lines, and presents many facts corroborating the views advanced in the preceding sections.*

PAPER A.

PAPER A *(page 192) enumerates all the Steamers of the United States.*

PAPER B.

PAPER B *(page 193) gives a list of all the British Ocean Mail Lines.*

PAPER C.

PAPER C *(page 198) presents Projét of Franco-American Navigation.*

PAPER D.

PAPER D *(page 199) gives the Steam Lines between Europe and America.*

PAPER E.

PAPER E *(page 200) gives many extracts from eminent statesmen, corroborating views herein advanced.*

PAPER F.

PAPER F *(page 219) gives the Steam Lines of the whole world.*

PAPER G.

PAPER G *(page 220) American Mail Lines: Letter of Hon. Horatio King.*

PAPER H.

PAPER H *(page 221) List of British, French, and American Navies.*

HEADS OF ARGUMENT.

SECTION I.

PRESENT POSITION OF STEAM NAVIGATION.

THE SPLENDID TRIUMPHS OF STEAM: IT IS THE MOST EFFICIENT MEANS OF NATIONAL PROGRESS AND DEVELOPMENT: THE FORERUNNER OF CIVILIZATION: IMPORTANT TO THE UNITED STATES AS AN AGRICULTURAL, MANUFACTURING, AND COMMERCIAL COUNTRY: NATURE OF OUR

PEOPLE: MARITIME SPIRIT: VARIOUS COMMERCIAL COUNTRIES: OURS MOST ADVANTAGEOUSLY SITUATED: THE DESTINY OF AMERICAN COMMERCE: OUR COMMERCIAL RIVALS: GREAT BRITAIN: SHE RESISTS US BY STEAM AND DIPLOMACY: OUR POSITION: MOST APPROVED INSTRUMENTS OF COMMERCIAL SUCCESS: PORTUGAL AND HOLLAND: ENGLAND'S WISE STEAM POLICY: LIBERAL VIEWS OF HER STATESMEN: EXTENT OF HER MAIL SERVICE: HER IMMENSE STEAM MARINE, OF 2,161 STEAMERS: OUR CONTRAST: OUR DEPENDENCE ON GREAT BRITAIN: THE UNITED STATES MAIL AND COMMERCIAL STEAM MARINE IN FULL: A MOST UNFAVORABLE COMPARISON.

SECTION II.

NECESSITY OF RAPID STEAM MAILS.

ARE OCEAN STEAM MAILS DESIRABLE AND NECESSARY FOR A COMMERCIAL PEOPLE? THE SPIRIT OF THE AGE DEMANDS THEM: MUTUAL DEPENDENCE OF NATIONS: FAST MAILS NECESSARY TO CONTROL SLOW FREIGHTS: THE FOREIGN POST OF EVERY NATION IS MORE OR LESS SELFISH: IF WE NEGLECT APPROVED METHODS, WE ARE THEREBY SUBORDINATED TO THE SKILL OF OTHERS: THE WANT OF A FOREIGN POST IS A NATIONAL CALAMITY: OTHER NATIONS CAN NOT AFFORD US DUE FACILITIES: WARS AND ACCIDENTS FORBID: THE CRIMEA AND THE INDIES AN EXAMPLE: MANY OF OUR FIELDS OF COMMERCE NEED A POST: BRAZIL, THE WEST-INDIES, AND PACIFIC SOUTH-AMERICA: MAILS TO THE CONTINENT OF EUROPE BY THE NUMEROUS

CUNARD VESSELS: CORRESPONDENCE WITH AFRICA, CHINA, THE EAST-INDIES, THE MAURITIUS, AND AUSTRALIA: SLAVISH DEPENDENCE ON GREAT BRITAIN: DESIRABLE FOR OUR DIPLOMATIC AND CONSULAR SERVICE: FOR THE CONTROL OF OUR SQUADRONS: CASES OF SUFFERING: NECESSARY FOR DEFENSE: FOR CULTIVATING FRIENDLY RELATIONS AND OPENING TRADE: THE ATLANTIC TELEGRAPH WILL REQUIRE FASTER AND HEAVIER MAILS: OUR COMMERCE REQUIRES FAST STEAMERS FOR THE RAPID AND EASY TRANSIT OF PASSENGERS: MODES OF BENEFITING COMMERCE.

SECTION III.

THE CAPABILITIES OF OCEAN STEAM.

THE COMMERCIAL CAPABILITIES OF OCEAN STEAM: STEAM MAILS ARRIVE AND DEPART AT ABSOLUTELY FIXED PERIODS: UNCERTAINTY IS HAZARDOUS AND COSTLY: SUBSIDIZED STEAMERS GIVE A NECESSARILY HIGH SPEED TO THE MAILS: MONEY CAN NOT AFFORD TO LIE UPON THE OCEAN FOR WEEKS: COMPARED WITH SAIL: STEAMERS TRANSPORT CERTAIN CLASSES OF FREIGHT: THE HAVRE AND THE CUNARD LINES: THE CUNARD PROPELLERS: STEAMERS CAN AFFORD TO TRANSPORT EXPRESS PACKAGES AND GOODS: GOODS TAKEN ONLY TO FILL UP: WHY PROPELLERS ARE CHEAPER IN SOME CASES: STEAM IN SOME CASES CHEAPER THAN THE WIND: AN ESTIMATE: THE PROPELLER FOR COASTING: STEAM ON ITS OWN RECEIPTS HAS NOT SUCCEEDED ON THE OCEAN: MARINE AND

FLUVIAL NAVIGATION COMPARED: MOST FREIGHTS NOT TRANSPORTABLE BY STEAM ON ANY CONDITIONS: AUXILIARY FREIGHTING AND EMIGRANT PROPELLERS: LAWS OF TRANSPORT: RAPID MAILS AND LEISURE TRANSPORT OF FREIGHT THE LAW OF NATURE: THE PRICE OF COALS RAPIDLY INCREASING: ANTICIPATED IMPROVEMENTS AND CHEAPENING IN MARINE PROPULSION NOT REALIZED.

SECTION IV.

COST OF STEAM: OCEAN MAIL SPEED.

MISAPPREHENSION OF THE HIGH COST OF STEAM MARINE PROPULSION: VIEWS OF THE NON-PROFESSIONAL: HIGH SPEED NECESSARY FOR THE DISTANCES IN OUR COUNTRY: WHAT IS THE COST OF HIGH ADEQUATE MAIL SPEED: FAST STEAMERS REQUIRE STRONGER PARTS IN EVERY THING: GREATER OUTLAY IN PRIME COST: MORE FREQUENT AND COSTLY REPAIRS: MORE WATCHFULNESS AND MEN: MORE COSTLY FUEL, ENGINEERS, FIREMEN, AND COAL-PASSERS: GREAT STRENGTH OF HULL REQUIRED: ALSO IN ENGINES, BOILERS, AND PARTS: WHY THE PRIME COST INCREASES: THEORY OF REPAIRS: FRICTION AND BREAKAGES: BOILERS AND FURNACES BURNING OUT: REPAIRS TWELVE TO EIGHTEEN PER CENT: DEPRECIATION: SEVERAL LINES CITED: USES FOR MORE MEN: EXTRA FUEL, AND LESS FREIGHT-ROOM: BRITISH TRADE AND COAL CONSUMPTION.

THE NATURAL LAWS OF RESISTANCE, POWER, AND SPEED, WITH TABLE: THE RESISTANCE

VARIES AS IS THE SQUARE OF THE VELOCITY: THE POWER, OR FUEL, VARIES AS THE CUBE OF THE VELOCITY: THE RATIONALE: AUTHORITIES CITED IN PROOF OF THE LAW: EXAMPLES, AND THE FORMULÆ: COAL-TABLE; NO. I.: QUANTITY OF FUEL FOR DIFFERENT SPEEDS AND DISPLACEMENTS: DEDUCTIONS FROM THE TABLE: RATES AT WHICH INCREASED SPEED INCREASES THE CONSUMPTION OF FUEL: CONSUMPTION FOR VESSELS OF 2,500, 3,000, AND 6,000 TONS DISPLACEMENT: COAL-TABLE; NO. II.: FREIGHT-TABLE; NO. III.: AS SPEED AND POWER INCREASE, FREIGHT AND PASSENGER ROOM DECREASE: FREIGHT AND FARE REDUCED: SPEED OF VARIOUS LINES: FREIGHT-COST: COAL AND CARGO; NO. IV.: MR. ATHERTON'S VIEWS OF FREIGHT TRANSPORT.

SECTION V.

OCEAN MAIL STEAMERS CAN NOT LIVE ON THEIR OWN RECEIPTS.

INCREASE OF BRITISH MAIL SERVICE: LAST NEW LINE AT $925,000 PER YEAR: THE SYSTEM NOT BECOMING SELF-SUPPORTING: CONTRACT RENEWALS AT SAME OR HIGHER PRICES: PRICE OF FUEL AND WAGES INCREASED FASTER THAN ENGINE IMPROVEMENTS: LARGE SHIPS RUN PROPORTIONALLY CHEAPER THAN SMALL: AN EXAMPLE, WITH THE FIGURES: THE STEAMER "LEVIATHAN," 27,000 TONS: STEAMERS OF THIS CLASS WILL NOT PAY: SHE CAN NOT TRANSPORT FREIGHT TO AUSTRALIA: REASONS FOR THE SAME: MOTION HER NORMAL CONDITION: MUST NOT BE MADE A DOCK: DELIVERY OF FREIGHTS:

MAMMOTH STEAMERS TO BRAZIL: LARGE CLIPPERS LIE IDLE: NOT EVEN THIS LARGE CLASS OF STEAMERS CAN LIVE ON THEIR OWN RECEIPTS: EFFICIENT MAIL STEAMERS CARRY BUT LITTLE EXCEPT PASSENGERS: SOME HEAVY EXTRA EXPENSES IN REGULAR MAIL LINES: PACIFIC MAIL COMPANY'S LARGE EXTRA FLEET, AND ITS EFFECTS: THE IMMENSE ACCOUNT OF ITEMS AND EXTRAS: A PARTIAL LIST: THE HAVRE AND COLLINS DOCKS: GREAT EXPENSE OF FEEDING PASSENGERS: VIEWS OF MURRAY AND ATHERTON ON THE COST OF RUNNING STEAMERS, AND THE NECESSITY OF THE PRESENT MAIL SERVICE.

SECTION VI.

HOW CAN MAIL SPEED BE ATTAINED?

THE TRANSMARINE COMPARED WITH THE INLAND POST: OUR PAST SPASMODIC EFFORTS: NEED SOME SYSTEM: FRANCE AROUSED TO STEAM: THE SAILING-SHIP MAIL: THE NAVAL STEAM MAIL: THE PRIVATE ENTERPRISE MAIL: ALL INADEQUATE AND ABANDONED: GREAT BRITAIN'S EXPERIENCE IN ALL THESE METHODS: NAVAL VESSELS CAN NOT BE ADAPTED TO THE MAIL SERVICE: WILL PROPELLERS MEET THE WANTS OF MAIL TRANSPORT, WITH OR WITHOUT SUBSIDY? POPULAR ERRORS REGARDING THE PROPELLER: ITS ADVANTAGES AND DISADVANTAGES: BOURNE'S OPINION: ROBERT MURRAY: PROPELLERS TOO OFTEN ON THE DOCKS: THEY ARE VERY DISAGREEABLE PASSENGER VESSELS: IF PROPELLERS RUN MORE CHEAPLY IT IS BECAUSE THEY ARE SLOWER: COMPARED WITH SAIL: UNPROFITABLE STOCK:

CROSKEY'S LINE: PROPELLERS LIVE ON CHANCES AND CHARTERS: IRON IS A MATERIAL: SENDING THE MAILS BY SLOW PROPELLERS WOULD BE AN UNFAIR DISCRIMINATION AGAINST SAILING VESSELS: INDIVIDUAL ENTERPRISE CAN NOT SUPPLY MAIL FACILITIES: THEREFORE IT IS THE DUTY OF THE GOVERNMENT.

SECTION VII.

WHAT IS THE DUTY OF THE GOVERNMENT TO THE PEOPLE?

RESUMÉ OF THE PREVIOUS SECTIONS AND ARGUMENTS: IT IS THE DUTY OF THE GOVERNMENT TO FURNISH RAPID STEAM MAILS: OUR PEOPLE APPRECIATE THE IMPORTANCE OF COMMERCE, AND OF LIBERAL POSTAL FACILITIES: THE GOVERNMENT IS ESTABLISHED FOR THE BENEFIT OF THE PEOPLE: IT MUST FOSTER THEIR INTERESTS AND DEVELOP THEIR INDUSTRY: THE WANT OF SUCH MAILS HAS CAUSED THE NEGLECT OF MANY PROFITABLE BRANCHES OF INDUSTRY: AS A CONSEQUENCE WE HAVE LOST IMMENSE TRAFFIC: THE EUROPEAN MANUFACTURING SYSTEM AND OURS: FIELDS OF TRADE NATURALLY PERTAINING TO US: OUR ALMOST SYSTEMATIC NEGLECT OF THEM: WHY IS GREAT BRITAIN'S COMMERCE SO LARGE: CAUSES AND THEIR EFFECTS: HER WEST-INDIA LINE RECEIVES A LARGER SUBSIDY THAN ALL THE FOREIGN LINES OF THE UNITED STATES COMBINED: INDIFFERENCE SHOWN BY CONGRESS TO MANY IMPORTANT FIELDS OF COMMERCE: INSTANCES OF MAIL FACILITIES CREATING LARGE

TRADE: THE PENINSULAR AND ORIENTAL COMPANY'S TESTIMONY: THE BRITISH AND BRAZILIAN TRADE: SOME DEDUCTIONS FROM THE FIGURES: CALIFORNIA SHORN OF HALF HER GLORY: THE AMERICAN PEOPLE NOT MISERS: THEY WISH THEIR OWN PUBLIC TREASURE EXPENDED FOR THE BENEFIT OF THEIR INDUSTRY: OUR COMMERCIAL CLASSES COMPLAIN THAT THEY ARE DEPRIVED OF THE PRIVILEGE OF COMPETING WITH OTHER NATIONS.

SECTION VIII.

HOW SHALL THE GOVERNMENT DISCHARGE THIS DUTY?

WE NEED A STEAM MAIL SYSTEM: HOW OUR LINES HAVE BEEN ESTABLISHED: AMERICAN AND BRITISH POLICY CONTRASTED: SPASMODIC AND ENDURING LEGISLATION: MR. POLK'S ADMINISTRATION ENDEAVORED TO INAUGURATE A POLICY: GEN. RUSK ENDEAVORED TO EXTEND IT: THE TERM OF SERVICE TOO SHORT: COMPANIES SHOULD HAVE LONGER PERIODS: A LEGISLATION OF EXPEDIENTS: MUST SUBSIDIZE PRIVATE COMPANIES FOR A LONG TERM OF YEARS: SHOULD WE GIVE TO OUR POSTAL VESSELS THE NAVAL FEATURE: OUR MAIL LINES GAVE AN IMPULSE TO SHIP-BUILDING: LET US HAVE STEAM MAILS ON THEIR MERITS: NO NAVAL FEATURE SUBTERFUGES: THESE VESSELS HIGHLY USEFUL IN WAR: THEY LIBERALLY SUPPLY THE NAVY WITH EXPERIENCED ENGINEERS WHEN NECESSARY: THE BRITISH MAIL PACKETS GENERALLY FIT FOR WAR SERVICE: LORD

CANNING'S REPORT: EXPEDIENTS PROPOSED FOR CARRYING THE MAILS: BY FOREIGN INSTEAD OF AMERICAN VESSELS: DEGRADING EXPEDIENCY AND SUBSERVIENCY: WE CAN NOT SECURE MAIL SERVICE BY GIVING THE GROSS RECEIPTS: THE GENERAL TREASURY SHOULD PAY FOR THE TRANSMARINE POST: REQUIREMENTS FOR NEW CONTRACTS: METHOD OF MAKING CONTRACTS: THE LOWEST BIDDER AND THE LAND SERVICE: THE OCEAN SERVICE VERY DIFFERENT: BUT LITTLE UNDERSTOOD: LOWEST-BIDDER SYSTEM FAILURES: SENATOR RUSK'S OPINION: INJURIOUS EFFECTS OF LOWEST BIDDER: INDIVIDUAL EFFORTS AND RIGHTS.

SECTION IX.

THE BRITISH SYSTEM, AND ITS RESULTS.

STEAM MAIL SYSTEM INAUGURATED AS THE PROMOTER OF WEALTH, POWER, AND CIVILIZATION: THE EFFECT OF THE SYSTEM ON COMMERCE: THE LONG PERIOD DESIGNATED FOR THE EXPERIMENT: NEW LINES, WHEN, HOW, AND WHY ESTABLISHED: THE WORKINGS OF THE SYSTEM: FIRST CONTRACT MADE IN 1833, LIVERPOOL AND ISLE OF MAN: WITH ROTTERDAM IN 1834: FALMOUTH AND GIBRALTAR, 1837: ABERDEEN, SHETLAND, AND ORKNEYS, 1840: THE "SAVANNAH," THE FIRST OCEAN STEAMER: THE SIRIUS AND GREAT WESTERN: CUNARD CONTRACT MADE IN 1839: EXTRA PAY "WITHIN CERTAIN LIMITS:" MALTA, ALEXANDRIA, SUEZ, EAST-INDIES, AND CHINA IN 1840: THE PENINSULAR AND ORIENTAL COMPANY: WEST-

INDIA SERVICE ESTABLISHED IN 1840: POINTS TOUCHED AT: PROVISIONAL EXTRA PAY: PANAMA AND VALPARAISO LINE ESTABLISHED IN 1845: HOLYHEAD AND KINGSTON IN 1848: ALSO THE CHANNEL ISLANDS: WEST COAST OF AFRICA AND CAPE OF GOOD HOPE IN 1852: CALCUTTA VIA THE CAPE IN 1852, AND ABANDONED: PLYMOUTH, SYDNEY, AND NEW SOUTH WALES ALSO IN 1852, AND ABANDONED: INVESTIGATION OF 1851 AND 1853, AND NEW AUSTRALIAN CONTRACT IN 1856: HALIFAX, NEWFOUNDLAND, BERMUDA, AND ST. THOMAS IN 1850: NEW-YORK AND BERMUDA SOON DISCONTINUED: COMPARISON OF BRITISH AND AMERICAN SUBSIDIES, RATES PER MILE, TOTAL DISTANCES, AND POSTAL INCOME: THE BRITISH GOVERNMENT PAYS HIGHER SUBSIDIES THAN THE AMERICAN: WORKINGS AND INCREASE OF THE BRITISH SERVICE: GEN. RUSK'S VIEWS: SPEECH OF HON T. B. KING: COMMITTEE OF INVESTIGATION, 1849: NEW INVESTIGATION ORDERED IN 1853, AND INSTRUCTIONS: LORD CANNING'S REPORT AND ITS RECOMMENDATIONS: GREAT BRITAIN WILL NOT ABANDON HER MAIL SYSTEM: THE NEW AUSTRALIAN LINE: TESTIMONY OF ATHERTON AND MURRAY: MANY EXTRACTS FROM THE REPORT: STEAM INDISPENSABLE: NOT SELF-SUPPORTING: THE MAIL RECEIPTS WILL NOT PAY FOR IT: RESULT OF THE WHOLE SYSTEM: ANOTHER NEW SERVICE TO INDIA AND CHINA: SHALL WE RUN THE POSTAL AND COMMERCIAL RACE WITH GREAT BRITAIN? CANADA AND THE INDIES.

SECTION X.

THE MAIL LINES OF THE UNITED STATES.

THE MAIL LINES OF THE UNITED STATES: THE HAVRE AND BREMEN, THE PIONEERS: THE BREMEN SERVICE RECENTLY GIVEN TO MR. VANDERBILT: BOTH LINES RUN ON THE GROSS RECEIPTS: THE CALIFORNIA LINES: WONDROUS DEVELOPMENT OF OUR PACIFIC POSSESSIONS: THE PACIFIC MAIL STEAMSHIP COMPANY: ITS HISTORY, SERVICES, LARGE MATERIEL, AND USEFULNESS: THE UNITED STATES MAIL STEAMSHIP COMPANY: ITS RAMIFIED AND LARGE EXTRA SERVICE: EFFECT UPON THE COMMERCE OF THE GULF: ITS HEAVY LOSSES, AND NEW SHIPS: STEAMSHIP STOCKS GENERALLY AVOIDED: CONSTANTLY FAR BELOW PAR: THE COLLINS LINE: A COMPARISON WITH THE CUNARD: ITS SOURCES OF HEAVY OUTLAY, AND ITS ENTERPRISE: THE AMERICAN MARINE DISASTERS COULD NOT HAVE BEEN PREVENTED BY HUMAN FORESIGHT; THE VANDERBILT BREMEN LINE: THE CHARLESTON AND HAVANA LINE.

SECTION I.

PRESENT POSITION OF STEAM NAVIGATION.

THE SPLENDID TRIUMPHS OF STEAM: IT IS THE MOST EFFICIENT MEANS OF NATIONAL PROGRESS

AND DEVELOPMENT: THE FORERUNNER OF CIVILIZATION: IMPORTANT TO THE UNITED STATES AS AN AGRICULTURAL, MANUFACTURING, AND COMMERCIAL COUNTRY: NATURE OF OUR PEOPLE: MARITIME SPIRIT: VARIOUS COMMERCIAL COUNTRIES: OURS MOST ADVANTAGEOUSLY SITUATED: THE DESTINY OF AMERICAN COMMERCE: OUR COMMERCIAL RIVALS: GREAT BRITAIN: SHE RESISTS US BY STEAM AND DIPLOMACY: OUR POSITION: MOST APPROVED INSTRUMENTS OF COMMERCIAL SUCCESS: PORTUGAL AND HOLLAND: ENGLAND'S WISE STEAM POLICY: LIBERAL VIEWS OF HER STATESMEN: EXTENT OF HER MAIL SERVICE: HER IMMENSE STEAM MARINE, OF 2,161 STEAMERS: OUR CONTRAST: OUR DEPENDENCE ON GREAT BRITAIN: THE UNITED STATES MAIL AND COMMERCIAL STEAM MARINE IN FULL: A MOST UNFAVORABLE COMPARISON.

The agreeable and responsible duty of developing and regulating the most important discovery of modern times, and the greatest material force known to men, has been committed to the present generation. The progress of Steam, from the days of its first application to lifting purposes, through all of its gradations of application to railway locomotion and steamboat and steamship propulsion down to the present time, has been a series of splendid and highly useful triumphs, alike creditable to the genius of its promoters, and profitable to the nations which have adopted it. However great the progress of the world, or the prosperity of commercial nations prior to its introduction, it can not be doubted that it now constitutes the largest, surest, and most easily available means of progress, prosperity, and power

known to civilized nations; or that the development, wealth, and independence of any country will be in the ratio of the application of steam to all of the ordinary purposes of life. It has been canonized among the sacred elements of national power, and commissioned as the great laborer of the age. Every civilized nation has adopted it as the best means of interior development, and as almost the only forerunner of commerce and communication with the outer world. It has thus become an indispensable necessity of every day life, whether by land or by sea, to the producer, the consumer, the merchant, the manufacturer, the artisan, the pleasure-seeker, the statesman, and the state itself, to public liberty, and to the peace of the world.

The existence of an agent of so great power and influence, is necessarily a fact of unusual significance to a nation like the United States, which combines within itself in a high degree, the three most important interests, of large Agricultural and Mineral Productions, extensive and increasing Manufactures, and an immense Foreign Commerce and Domestic Trade. Our country is essentially commercial in its tastes and tendencies; our people are, as a result of our common schools, bold, inquiring, and enterprising; and our constitution and laws are well calculated to produce a nation of restless and vigorous merchants, traders, and travellers. Foreign commerce is a necessity of our large and redundant agricultural production. Our extended sea-coast, and necessarily large coasting-trade between the States, have begotten an unbounded spirit of maritime adventure. The ample material, and other facilities for building vessels, have also contributed to this end. As capable as any people on earth of running

vessels and conducting mercantile enterprise, we have found foreign commerce a profitable field for the investment of labor, intelligence, and capital.

There is scarcely any field of trade in the world which we are not naturally better calculated to occupy than any other country. Most of the great commercial nations employ their ships as common carriers for other nations, and limit their exports to manufactures alone. Great Britain is an example of this. She exports no products of the soil, for very obvious reasons. The exports of France partake of the same general character, domestic manufactures, with a small portion of the products of the soil. So, also, with the German States and Holland. The United States, to the contrary, have an immense export trade in the products of the soil. These exports have the advantage of embracing every production of the temperate zone, and some few of the more profitable of those of the torrid. These constitute a large source of wealth, and are daily increasing in quantity, value, and importance. Combined with the manufactured productions of the country, and the yield of the mines, they require a large amount of shipping, which, extending to nearly all nations, opens a diversified and rich field of trade. The exchanges of production between our own and other countries, are, consequently, very large and general, and must continue to increase to an indefinite extent, as the States and Territories of the Union fill up, and as the various new and opening branches of domestic industry develop and mature.

The extent which this trade will reach in a few generations, its aggregate value, and the influence which it will wield over the world if judiciously and energetically promoted, and if wisely protected

against encroachment from abroad, and embarrassment at home, no human foresight can predict or adequately imagine. With a larger field of operations, at home and abroad, than any nation ever possessed before, with the pacific commercial policy of the age, and with the aids of science, the telegraph, and steam to urge it on, American Commerce has opened before it a glorious career and an imposing responsibility.

But the conquests of this commerce are not to be the bloodless victories of power unopposed; not the result of bold adventure without check, or of simply American enterprise without the Government's aid. Our foe is a wary, well-scarred, and well-tried old warrior, who has the unequalled wisdom of experience, and the patient courage that has triumphed over many defeats. The field has been in his hands for ten generations, and he knows every byway, every marsh, every foot of defense, and the few inassailable points to be preserved and guarded. Great Britain, particularly, knows how essential is a large general commerce for opening a market for her manufactures. She is dependent on those manufactures, and upon the carrying trade of the world for a living; and she fosters and protects them not alone by the reputed and well-known individual enterprise and energy of her people, but by a wise and forecasting policy of state, a mighty and irresistible naval and military array, a wisely concerted, liberal, well-arranged, and long-pursued steam system, and prompt, unflinching protection of British subjects in their rights throughout the world.

Great Britain is prepared to resist our commercial progress, as she has already done, step by step, by all the means within her power. She has wisely brought

steam to her aid, and now has a system of long standing at last well matured. Her diplomacy has ever been conspicuous throughout the world, for ability and zeal, whether in the ministerial or consular service, and for its persistent advocacy of British rights in trade as well as for its machinations against the extension of the commerce or the power of this country. Such action on the part of any wise rival nation is naturally to be expected; and all that we can object to is that, seeing this policy and its inevitable tendency, our country should stand still and suffer her trade to be paralyzed and wrested from her, without an effort to relieve it, or the employment of any of those commercial agencies and facilities which experience shows to be all-efficient in such cases. It is utter folly for us to maintain a simply passive competition; we must either progress or retrograde. It is wrong to be willing to occupy a secondary place, when nature and the common wants of the world so clearly indicate that we should occupy the first; for if, as before assumed, foreign commerce is our destiny, and if we can not accomplish our highest capabilities except by commerce, then if we ever attain our true dignity and station as a nation, it must be by enlarging, liberalizing, strengthening, and encouraging our foreign trade, by all of the proper, efficient, and honorable means within our power. It is the duty of the Government, both to itself and to its citizens. (*See Section VII.*)

The history of commercial nations admonishes us that no trading people can long maintain their ascendency without using all of the most approved means of the age for prosecuting trade. Portugal was at one time the most powerful commercial nation of

the globe; and at another Holland was the mistress of the seas. But while the latter is now only a fourth-rate commercial power, the former has sunk into obscurity, and is nearly forgotten of men. At that time England and France had but a limited foreign trade and scarcely any commercial reputation. France could more easily maintain her existence without a foreign trade, than could England; and yet her matured manufactures and her products of the soil became so valuable that she sought a foreign market. England, to the contrary, had not territory enough to remain at home, and yet be a great power. She matured an immense manufacturing system, and needed a market, as well as the raw material, and food for her operatives. She began to stretch her arms to the outer world, and had made very considerable strides in foreign commerce side by side with France and the German States, and in the face of the steady young opposition of the American States.

It now became a contest for supremacy. Her large navy had enabled her to conquer important foreign territories, which with the supremacy of the seas would make her the mistress of the world. France was still her equal rival, and the United States were becoming formidable common carriers, although they had but little legitimate commerce of their own, and none that was under their positive control. The commercial men of England finding their statesmen ready to aid them in their efforts for national progress, wealth, and glory, directed their attention to steam as an agent of supremacy and power, both in the Navy and the Commercial Marine. They indicated and proved the necessity of drawing the bonds between them and foreign countries more

closely; of shortening the distances between them; of providing the means of rapid, safe, and comfortable transit of English merchants between their homes and foreign lands; of regular, rapid, reliable British steam mails to every point with which Englishmen had business, or could create it; and of government agency as the only means by which this desirable, this essential service could be rendered to commerce and to the country. They readily saw that rapid and reliable passenger facilities, and the rapid and regular transmission of commercial and diplomatic intelligence would give to British merchants and to British statesmen the certain control of commerce, and the conformation of the political destinies of many of the smaller nations of the Eastern and Western hemispheres.

It was not a difficult task to convince the British statesman that it was his duty to encourage the commerce, on which the wealth, power, and glory of his country depended, by all the aids known to the constitution; and to uphold the hands of the merchant by the use of the money which his traffic had brought into the public coffers. There was no contest between North and South, East and West. It was the whole of England which was to be benefited directly or indirectly; and they were willing that it should be any part rather than none. The evident advantages which the United States possessed in her more numerous articles of export, (*see page 16*,) as well as the rapid strides which her first clippers were making across the ocean, were reasons urgent enough for the forecasting statesmen of Britain; and they determined to continue or to obtain the profitable dominion of the seas, although it might cost a sum of money far beyond the postal income.

They knew that these postal and passenger facilities were needed by every class of community, and that there was no one in the kingdom who would not be in some way benefited by them; and that the sums of money paid for them, although not apparently returned, were yet returned in a thousand indirect channels and by a variety of reflex benefits not calculable as a transaction of exchange.

We, therefore, see to-day, as the fruit of that determination, the proudest and the most profitable postal and mercantile steam marine that floats the seas. Several large companies, authorized to transport the mails to all parts of the world, were immediately organized, and paid liberal allowances for their peculiar duties. Where the practicability of the service was considered doubtful, larger sums were paid, and a greater length of time granted for making the experiment. The contracts were generally made for twelve years; and when their terms expired they were renewed for another term of twelve years, which will expire in 1862. Thus many of the lines have been in operation for the last nineteen years, and have demonstrated the practicability, the cheapness, the utility, and the necessity of such service. The entire foreign mail service is conducted by fifteen companies, having one hundred and twenty-one steamers, with a gross tonnage of 235,488 tons; the net tonnage being 141,293, assuming the engines, boilers, fuel, etc., to be forty per cent of the whole tonnage, which is altogether too low an estimate. The whole number of British sea-going steamers is sixteen hundred and sixty-nine, with an aggregate tonnage of 383,598 tons, exclusive of engines and boilers, and of 639,330 tons gross, including engines and boilers. (*See paper A, page*

192.) We must add to this list the new steamer "Great Eastern," whose tonnage is twenty-seven thousand tons, and which will make the entire present mercantile steam tonnage of Great Britain 660,330 tons. The greater portion of these steamers, exclusive of those engaged in the foreign mail service, are employed in the coasting and foreign continental trade; while some few of them run in the American merchant service, and many others in the subsidized mail service of foreign countries, such as the lines from Hamburgh and Antwerp to Brazil, and from those cities to the United States. Some of them are also engaged in the mail service between Canada and England, under the patronage of the Canadian government. (*See paper D, page 199.*) If we add to this list the 271 war steamers, the 220 gunboats, and the Great Eastern, we shall find that the British Mail, Mercantile, and War Marine consists of the enormous number of two thousand one hundred and sixty-one steamers, exclusive of the large number now building. Nearly all of these are adapted to the ocean, or to the coasting service, and may be classed as sea-going vessels.

It is interesting to trace this rapid progress of steam since its first application to purposes of mail transport in 1833. An intelligent writer says, "The rise and progress of the ocean steam mail service of Great Britain is second in interest to no chapter in the maritime history of the world;" and while we acknowledge a grateful pride in the triumphs of our transatlantic brethren, we must blush with shame at our dereliction in this great, and civilizing, and enriching service of modern times. The steam marine of the United States, postal, mercantile, and naval, is to-day so insignificant in extent that we do not feel

entirely certain that it is a sufficient nucleus for the growth of a respectable maritime power. The few ships that we possess are among the fleetest and the most comfortable that traverse the ocean, and have excited the admiration of the world wherever they have been seen. But their number is so small, their service so limited, their field of operation so contracted, that our large commerce and travel are dependent, in most parts of the world, on British steam mail lines for correspondence and transport, or on the slow, irregular, and uncertain communications of sailing vessels. The question here naturally suggests itself: Have we progressed in ocean steam navigation in a ratio commensurate with the improvements of the age, or of our own improvement in every thing else? And has the Government of the country afforded to the people the facilities of enterprise and commercial competition which are clearly necessary to enable them to enter the contest on equal terms with other commercial countries? (*See Section VII.*)

The Ocean Mail Service of the United States, consists of eight lines, and twenty one steamers in commission, with an aggregate tonnage of 48,027 tons. Three of these lines are transatlantic; the Collins, the Havre, and the Bremen. Two connect us with our Pacific possessions, and incidentally with Cuba and New-Granada. They are however indispensable lines of coast navigation. One connects the ports of Charleston, in the United States, and Havana, in Cuba, another connects New-Orleans with Vera Cruz, and another connects Havana and New-Orleans. Beyond these, we have a line of two steamers running between New-York and New-Orleans, touching at Havana, and one steamer

touching at the same point between New-York and Mobile. Also four steamers between New-York and Savannah, four between New-York and Charleston, two between New-York and Norfolk, two between Philadelphia and Savannah, two between Boston and Baltimore, four between New-Orleans and Texas, and two between New-Orleans and Key West. All of these are coast steamers of the best quality; and some few of them have a nominal mail pay. We have also several transient steamers which have no routes or mail contracts, and which are consequently employed in irregular and accidental service, or laid up. They are the Ericsson, the Washington and the Hermann, the Star of the West, the Prometheus, the Northern Light, the Daniel Webster, the Southerner, the St. Louis, laid up in New-York; the Uncle Sam, the Orizaba, and the Brother Jonathan, belonging to the Nicaragua Transit Company, and the California, Panamá, Oregon, Northerner, Fremont, and the tow-boat Tobago, belonging to the Pacific Mail Steamship Company, all lying in the Pacific. Also the Queen of the West, Mr. Morgan's new steamer, in New-York. These, like all other American steamers when unemployed on mail lines, generally lie in port for want of a remunerative trade. (*See* *Paper A*.)

The aggregate tonnage of these fifty-seven steamers is 94,795 tons. Eighteen of them, with an aggregate tonnage of 24,845 tons, are engaged in no service. Twenty-three of them, with 24,071 tons, are engaged in our coasting trade. Fourteen of them, with 19,813 tons, (Gov. register,) are engaged in the California, Oregon, Central American, Mexican, and Cuban mail service; while eight of them, with 25,178 tons aggregate tonnage, are engaged in the transatlantic mail service proper, between this country and

Europe. It is thus seen that we have in all but 57 ocean steamers, of 94,795 aggregate tons; while Great Britain has sixteen hundred and seventy, with 666,330 aggregate tons; that we have twenty-two of these, of 45,001 tons, engaged in the foreign and domestic mail service, while she has one hundred and twenty-one, of 235,488 aggregate tonnage, engaged in the foreign mail service almost exclusively; and that we have thirty-seven steamers engaged in the coasting trade and lying still, while she has fifteen hundred and forty-eight steamers engaged in her coasting trade and merchant service. (*See page 167*, for length of British and American mail lines, and the miles run per year.) Comparisons are said to be odious, but it is more odious for such comparisons as these to be possible in these days of enlightened commercial enterprise and thrift; and especially when so greatly to the disadvantage of a country which boldly claims an aggregate civilization, enterprise, and prosperity equalled by those of no other country on the globe. As regards our steam navy, it is too small to afford adequate protection to our commerce and citizens; much less to defend the country in time of war. We have not steamers enough in the navy to place one at each of our important seaports; much less to send them to foreign stations.

SECTION II.

NECESSITY OF RAPID STEAM MAILS.

ARE OCEAN STEAM MAILS DESIRABLE AND NECESSARY FOR A COMMERCIAL PEOPLE? THE SPIRIT OF THE AGE DEMANDS THEM: MUTUAL DEPENDENCE OF NATIONS: FAST MAILS NECESSARY TO CONTROL SLOW FREIGHTS: THE FOREIGN POST OF EVERY NATION IS MORE OR LESS SELFISH: IF WE NEGLECT APPROVED METHODS, WE ARE THEREBY SUBORDINATED TO THE SKILL OF OTHERS: THE WANT OF A FOREIGN POST IS A NATIONAL CALAMITY: OTHER NATIONS CAN NOT AFFORD US DUE FACILITIES: WARS AND ACCIDENTS FORBID: THE CRIMEA AND THE INDIES AN EXAMPLE: MANY OF OUR FIELDS OF COMMERCE NEED A POST: BRAZIL, THE WEST-INDIES, AND PACIFIC SOUTH-AMERICA: MAILS TO THE CONTINENT OF EUROPE BY THE NUMEROUS CUNARD VESSELS: CORRESPONDENCE WITH AFRICA, CHINA, THE EAST-INDIES, THE MAURITIUS, AND AUSTRALIA: SLAVISH DEPENDENCE ON GREAT BRITAIN: DESIRABLE FOR OUR DIPLOMATIC AND CONSULAR SERVICE: FOR THE CONTROL OF OUR SQUADRONS: CASES OF SUFFERING: NECESSARY FOR DEFENSE: FOR CULTIVATING FRIENDLY RELATIONS AND OPENING TRADE: THE ATLANTIC TELEGRAPH WILL REQUIRE FASTER AND HEAVIER MAILS: OUR COMMERCE REQUIRES FAST STEAMERS FOR THE RAPID AND EASY TRANSIT OF PASSENGERS: MODES OF BENEFITING COMMERCE.

Having seen that the ocean steam mail service is largely developed in some countries, especially in Great Britain, and that the second and third commercial powers of the world, the United States and France, have not largely employed this important agent in their commerce, the inquiry

naturally arises, whether fast ocean steam mails are desirable and necessary to the commercial prosperity of a people. Whether this question be considered in its relative or its natural bearings, the reply is the same. Relatively considered, a large ocean steam mail service is indispensable to a people who are largely commercial, because the most noted commercial rivals of the world employ it, and thus either force them to its use, or the loss of their commerce, and the gradual transference of their shipping and trade into the hands of their rivals. Considered in its natural bearings, in its direct influences and effects *per se*, it becomes even more evidently necessary, as the means of a ready and reliable knowledge of the condition, wants, and movements of all those with whom a commercial nation necessarily has business, or could or should create it.

The spirit of the age demands a more intimate acquaintance and communication than we have hitherto had with the outer world. Our knowledge of foreign lands has pointed out innumerable wants hitherto unknown, and suggested innumerable channels of their supply. Nations have learned to depend on each other as formerly neighbor depended on his neighbor for any little necessary or luxury of life. The luxurious spirit of the times requires the importation and exportation of an immense list of articles with which foreign countries were formerly unacquainted, but which have now become as indispensable as air, and light, and water. And if it is not necessary that these many articles shall be transported from land to land with the speed of the telegraph or the fleetness of the ocean steamer, it is at any rate necessary that the facts concerning them,

their ample or scarce supply, their high or low price, their sale or purchase, their shipment or arrival, their loss, or seizure, or detention, should be made known with all of the combined speed of the telegraph, the lightning train, and the rapid ocean mail steamer. If we possess ourselves these facilities of rapid, regular, and reliable information to an extent that no other nation does, we will be the first to reach the foreign market with our supplies, the first to bring the foreign article into the markets of the world, and the proper recipients of the first and largest profits of the cream of the trade of every land.

If we neglect these precautions, and refuse to establish these facilities, because their cost is apparent in one small sum of expenditure, while their large returns in profits diffused among the whole people are not so palpably apparent to the common eye; if we leave to the genius and enterprise of the people that which private enterprise and human skill unaided can never accomplish; in a word, if we fail to keep up with the world around us, and to progress *pari passu* with our wise, acute, and experienced commercial rivals, then, as a matter of course, the information which we receive from the foreign world must come through others, and those our rivals, and must be deprived of its value by the advantage which they have already taken of it. It is idle to suppose that any commercial nation on earth will not so arrange her foreign post as to exclude others than her own citizens as much as possible from its benefits. This is a paramount duty of the government to the citizen. It is therefore apparent that our commerce must of necessity greatly suffer when its conduct is at all dependent on foreigners and competitors, and that it is exceedingly desirable,

for the avoidance of such a calamity, that we should have independent and ample foreign mail facilities of our own, wherever it is possible for our people to trade and obtain wealth.

It is clearly impossible that other nations should afford these facilities, or that our people should have confidence in them if attempted, or that they could be in any sense reliable in those many cases of exigency, national disputes, war, and accident, which usually afford us our best chances of speculation and profit. A dependence on foreigners for this supply of information, which never reaches us until it is emasculated of its virtues, is extremely hazardous. It fails just at the point where it is most desirable. Foreign nations, especially the commercial European nations, are constantly at war, and are constantly interrupting their packet service. The late Crimean and the present Indian wars are a good illustration. Our country, isolated from the contending nations, and fortified against continual ruptures by a policy of non-intervention, is peculiarly blessed with the privilege and ability to regularly and unintermittingly conduct her commerce and reap her profits, even more securely, while her rivals are temporarily devoting their attention to war. Such being the fact, it is wholly desirable and necessary to the end proposed that our steam post should on all such occasions regularly come and go, even amid the din of battle, and the conflict of our rivals, who for the time are powerless to oppose our peaceful and legitimate commerce, and are generally but too glad to avail its offerings.

There are many instances of the desirableness and the necessity of the transmarine steam post on important lines of foreign communication where we

have a large trade, and yet no postal means of conducting it. Our immense trade with Brazil and other portions of South-America, which if properly fostered would increase with magic rapidity, sends its news and its freight by the same vessel, or is compelled to use the necessarily selfishly arranged, and circuitous, and non-connecting lines of Great Britain. A letter destined for Brazil, four thousand miles distant, must needs go by England, Portugal, the Coast of Africa, Madeira, and the Cape de Verdes, a distance of eight thousand miles, in a British packet. One destined for the Pacific Coast of South-America must go to Panama and await the arrival of the English packet, with London letters more recently dated, before it can proceed on to Callao, Lima, or Valparaiso. Letters destined to the West-Indies can go to Havana only, by American steamers; but they must there await the British line which takes them to St. Thomas, and there be distributed and forwarded to the various islands, the Spanish Main, the Guianas, Venezuela, and New-Granada by some one of the ten different British steam packet lines running semi-monthly from that station.

So with half of our letters which go to the Continent of Europe: they must go by the Cunard line to England, and thence by English steamers to the British Channel, the Baltic, the White Sea, the Mediterranean, Egypt, Constantinople, or the Black Sea. Those to places along the coast of Africa and to the Cape of Good Hope are dependent on the same English packet transit. For our communication with China, India, Australia, the East-Indies generally, and the Islands of the Pacific, we are entirely and slavishly dependent, as usual, on Great Britain. Instead of sending our letters and passengers direct

from Panamá or San Francisco to Honolulu, Hong Kong, Shanghae, Macáo, Calcutta, Ceylón, Bombáy, Madrás, Sydney, Melbourne, Batavia, the Mauritius, and the Gulf of Mozambique, by a short trunk line of our own steamers, and from its terminus only, by the British lines, they now go first to England, as a slavish matter of course, then across the Continent or through the Mediterranean to Egypt, thence by land to the Red Sea, and thence to China and the East-Indies; or from England by her steam lines around the Cape of Good Hope to Australia and the East-Indies; or by slow and uncertain sailing packets direct from our own country, either around Cape Horn or the Cape of Good Hope. It is evident to every reflecting man who has given the subject any attention, that all of these lines of communication would be very desirable, and very highly profitable to our people at large; and that the latter and that along the West Coast of South-America could be easily established by two new contracts for that purpose, or in some other way, to the great and lasting advantage of our countrymen.

The transmarine post is very desirable for the better conduct of our foreign diplomacy and the consular service. It is now almost impossible for our ministers and agents abroad to hold any thing like a regular correspondence with the State Department, unless it be those in Southern and Western Europe. I was told last year by our Minister in Rio de Janeiro that his dispatches from the Government at home seldom reached him under four months; and Mr. Gilmer, the Consul of the United States at Bahia, reports, in the "Consular Returns" now about to be published, that his dispatches never come to hand under four months, that they are frequently out six months, and

that many are lost altogether. This is the experience and the reïterated complaint of nearly every foreign *employée* of the Government, who has any zeal in prosecuting his country's business, and may find it necessary to get instructions or advice from home. Many knowing the delays, uncertainty, and irregularity of correspondence, make no attempt whatever to communicate regularly with the Department. We frequently express great surprise that we have no intelligence from our ministers, special ambassadors, and agents; but do not reflect that in the majority of cases dispatches have to be sent by irresponsible and slow-sailing vessels, or by the steamers of Great Britain, which it may be safely asserted are in no particular hurry to deliver them to us. Three several letters sent by me at separate times through the British mail from Rio de Janeiro for New-York never reached their destination.

Nor is it better with our squadrons on foreign stations. They receive their orders in the same slow and irregular way, and find it almost as easy to send a vessel when they wish to communicate with the Navy Department, or await the movements of their dull old storeships, as to attempt any other means of intercourse. It may be safely said that they are not actually under the control of the Department, in many important cases, one time in ten. Whatever the dispute, it is left entirely at the will of the Commodore, or it remains unsettled altogether. Our recent accumulated Paraguayan difficulties is a case in point. American citizens were driven from the country, and their valuable property confiscated. They applied to the Commodore for relief, but could not obtain it. Our surveying vessel, engaged in a permitted scientific exploration, was fired into and

had some of her men killed; and redress being demanded by the Captain from the Commodore, it was refused. The Commodore feared transcending his instructions: he could not communicate with the home authorities much under a year; and so the case rested, and yet rests. These wants, papable as they are in times of peace, become doubly pressing in time of war. Let a conflict commence with England, or France, on whom we depend for mails, or with their allies, and they could easily surprise and destroy every squadron which we have upon the high seas months before they would necessarily hear of a declaration of war, or know why they were captured. The very contemplation of such possibilities is intolerable, and should be sufficient of itself, setting aside all considerations of commerce and diplomacy, to arouse our nation to the adoption of the proper means for its safety and defense.

An effective steam postal marine is unquestionably most desirable and necessary for the defense of our country, and for the prosecution of any foreign war. Lord Canning, the British Post-Master General, recently said in a report to the House of Lords, that although all of the steam mail packets might not be able to carry an armament, or be required in the transport service in time of war, yet the mail facilities which they would then afford would be more important and necessary than at any other time. He had no idea that because engaged in a foreign war the postal service would be useless, but to the contrary, more than ever indispensable. Such proved to be the fact in the late contest in the Crimea, and such is to-day the case with regard to the troubles in India and China. Their postal vessels have proven a first necessity in both of these wars,

not only for transport of the troops, but for speedy intelligence also. Without them, England could not have entered the Crimean contest, and the French forces would have been compelled to remain at home. Turkey would have been overawed, and Constantinople would have fallen before the Russian fleet. We are to-day, and always must be, liable to a foreign war. We have a great boiling cauldron running over with excitement all along our southern and south-western borders. Central America, Cuba, the West-Indies, and South-America are far more foreign countries to us than Europe or the Mediterranean to England. Cuba will no doubt be at some day our most important naval station and possession. Even the defense of our own coast would require an immense transport service; for Texas is nearly four thousand miles from Maine, and California is seven thousand from the Atlantic seaboard. No better proof can be given of the necessity of a large and extra naval transport service than the late Mexican war. But for our steamers it would have taken us years to concentrate an army on the shores of Mexico. It was a tedious process at the time; for our ocean mail packets were not then in use. We could now land a larger number of men there in one month than we then did in a whole year. But our transport facilities are not yet by any means adequate.

A large postal steam marine is desirable as a means of cultivating the sympathies and respect of foreign nations, by bringing them into closer friendly and commercial connection with us; and for creating among them that respect and consideration which the British statesmen so well know to be an easy means of conducting diplomacy, and an unfailing

source of commercial advantages. It is not necessary that we shall impose upon foreign countries in these respects by false pretenses; but it is truly desirable, and it would be profitable to an extent little imagined, to let them know our real importance as a nation, and understand our pacific policy and *bona fide* intentions. These are important considerations when we wish to carry any point, establish any line of policy, remove any prejudice; and nothing will more readily produce them, and arouse attention to our articles of export, and induce a people to establish a regular business with us, than these ever-present, convenient, and imposing mail steamers. Nations as well as individuals estimate us by our appearances; and while it is not desirable that we shall appear more than we are, it is yet very important that foreign nations with which we have business shall know our real merits, and respect us for what we are intrinsically worth. There is evidently no means of our commercial triumph over other nations without a liberal and widely extended steam mail service; and as this triumph is of paramount importance to us, who have so many resources, so is the ocean steam mail as the only means of securing it. (*See views of Gen. Rusk, in papers appended.*)

It has recently been suggested by parties who certainly have not thought very deeply on the subject, that the completion of the Atlantic Telegraph, which every body reasonably expects soon to be completed, will so inaugurate a new era in the transmission of intelligence, that one of its effects will be the supersession of fast ocean mails, and consequently of subsidized steamers. It is a first and palpable view of this question that much of the

important intelligence between the two countries requiring speedy transmission will be sent through the telegraph, notwithstanding the necessarily high prices which will be charged for dispatches. These communications will be sententious, summary, and of great variety. The markets, prices, important political and other events, private personal and unelaborated intelligence will come over the wires just as they now come over existing land lines. The line will create extra facilities for operations on both sides, and cause more mutual business to be done. It will thus create the necessity for more correspondence than before, for particulars, elaboration, items, bills of lading, exchanges, duplicates, minute instructions, etc., to which there will be no end. The main transaction of any business being made more quickly, it will be essential for the papers to pass with greater dispatch. If there were twenty telegraphic wires working day and night, which never can be the case from their expensiveness, they could not do in a month the correspondence and business done by one steamer's mail. Beside this, those who got their dispatches first would have a decided advantage over those who would be compelled from the mass of business to wait several days. It is an advantage of the steam mails that all get their letters and papers at the same time; and that no one has thus the advantage of the other. It is hardly possible for one unacquainted with the postal business to conceive how large a mass of mail matter is deposited by each steamer; and it is only necessary to see this to realize that the Atlantic Telegraph will never materially interfere with the steamers except to require of them greater speed and heavier mails.

It is the experience on all of our land routes that the thousands of miles of telegraph, so far from superseding the mails, have made more mails necessary, have caused and required them to be much faster, have necessitated more correspondence, and induced people to live in more mutual dependence, to have more communication with one another, and to make the home or the business of a man less than formerly his closed castle, which none entered, and which no one had any occasion to enter. The American telegraph has now arrived at great perfection, and sends its electric throb to every corner of the Union, save California only. At the same time, the railroads of the country are taxed to their highest capacity. No period ever witnessed so many, so rapid, and so well-filled mails. It is evident that no telegraphic system can properly do detailed business. First, it is and must ever remain too costly. Second, it would require about as many lines as business men, to give them all equal chances, and no one the profitable precedence. Next, there is nothing positively accurate and fully reliable. No signatures can pass over the line. No transaction can be made final by it. No bank will pay, or ought to pay, money on public telegraphic drafts. And, as in the land service, so in the ocean. The telegraph across the ocean will simply create far more business for the mails, and make it desirable and indispensable that they shall be sent and received by the most rapid conveyance known to the times. Thus, it is evident that this new and as yet not fully established agent of international communication, so far from obviating our rapid transmarine service, will but the more effectually necessitate it.

Nor must it be forgotten that our commercial

prosperity largely depends on the ready and comfortable transit of passengers. The passenger traffic has increased with astonishing rapidity during the last eighteen years. Our smaller merchants can go abroad when mail steamers are plenty, and make their own purchases and sales, without paying heavy commissions and high prices to middlemen; do their business on less capital; and thus benefit themselves and reduce the prices to our consumers. Compared with sailing vessels, these few mail steamers become the forerunners of trade and commerce, and create an immense service for the sail. They enable us to save large sums of interest or advances on merchandise consigned, and give to us quick returns from the products which we ship abroad. This has long been evident to Great Britain, and she has acted liberally on the suggestion. So desirable is the service for the general prosperity of her people, that she expends annually for her foreign steam mails nearly six millions of dollars, while they do not return to the treasury much above three. She regards the expenditure as she does that for the navy and the army, a necessity for the public preservation and prosperity.

As regards the lines that we now have, they are among the noblest in the world. For aggregate comfort, convenience, safety, speed, and cheapness, they are not equalled by the most famous British lines. More luxurious tables, more neatness, cleanliness, and roominess, more general comforts than have always been characteristic of our Havre, Liverpool, and California lines, can not be found in the world. The only objection to them is, that the service is not sufficient; that the trips are not frequent enough; and that the companies are not

enabled to sustain a larger steam marine which would proportionally cheapen the service, and accommodate more persons and a much larger class of interests. Our experiences of the benefits of existing lines, limited as those lines are, present an unanswerable argument for the desirableness and necessity of a liberal steam postal system, and a large and judicious extension of the present service. (*See views of Senate Committee, 1852, Paper E.*)

SECTION III.

THE CAPABILITIES OF OCEAN STEAM.

THE COMMERCIAL CAPABILITIES OF OCEAN STEAM: STEAM MAILS ARRIVE AND DEPART AT ABSOLUTELY FIXED PERIODS: UNCERTAINTY IS HAZARDOUS AND COSTLY: SUBSIDIZED STEAMERS GIVE A NECESSARILY HIGH SPEED TO THE MAILS: MONEY CAN NOT AFFORD TO LIE UPON THE OCEAN FOR WEEKS: COMPARED WITH SAIL: STEAMERS TRANSPORT CERTAIN CLASSES OF FREIGHT: THE HAVRE AND THE CUNARD LINES: THE CUNARD PROPELLERS: STEAMERS CAN AFFORD TO TRANSPORT EXPRESS PACKAGES AND GOODS: GOODS TAKEN ONLY TO FILL UP: WHY PROPELLERS ARE CHEAPER IN SOME CASES: STEAM IN SOME CASES CHEAPER THAN THE WIND: AN ESTIMATE: THE PROPELLER FOR COASTING: STEAM ON ITS OWN RECEIPTS HAS NOT SUCCEEDED ON THE OCEAN: MARINE AND

FLUVIAL NAVIGATION COMPARED: MOST FREIGHTS NOT TRANSPORTABLE BY STEAM ON ANY CONDITIONS: AUXILIARY FREIGHTING AND EMIGRANT PROPELLERS: LAWS OF TRANSPORT: RAPID MAILS AND LEISURE TRANSPORT OF FREIGHT THE LAW OF NATURE: THE PRICE OF COALS RAPIDLY INCREASING: ANTICIPATED IMPROVEMENTS AND CHEAPENING IN MARINE PROPULSION NOT REALIZED.

Believing that no further arguments or facts are necessary to show that a rapid steam mail marine is desirable and essential to the successful government of the country, to our foreign commerce, and to the growth of individual interests and a general prosperity of the people, I shall now make some few inquiries concerning the Commercial Capabilities of steam, as the most effective agent for the rapid transit of the ocean, and the most expensive agent for the transport of goods. After this, it will be necessary to examine into the Cost of Steam, as a subject closely allied to its general capabilities.

Whatever may be said of the wind as a cheap agent of locomotion, this much may be safely predicated of steam vessels for the mails; that their time of departure and arrival has an absolute fixity which is attainable by no other means, and which is highly conducive to the best interests of all those for whom commerce is conducted. No reasoning is necessary to show to the man of business, or even to the pleasure-seeker, the importance of approximate certainty as to the time when the mail leaves and when he can receive an answer to his dispatches. He may not be able to give clearly philosophic reasons for it; yet he feels the necessity in his business; and it certainly relieves him of many painful doubts, if nothing more.

Uncertainty in commercial operations is always hazardous and costly to the great mass of the people, who as a general thing pay more for whatever they get, on the principle that we seldom take a venture in an uncertain thing unless it holds out inducements of large profit, or unless we get a high price for guarantying it. So in commercial correspondence, which constitutes the great bulk of the ocean mails. Let uncertainty prevail for but three or four days beyond the time when we should have news from abroad, and every body is in doubt, every body speculates, and in the end every body is injured.

Nor is this certainty in the time of arrival and departure of the mails more desirable than their speed. The common sense of the world has settled down upon the necessity of rapid mails; and all of the ingenuity of the age is now taxed to its very highest to secure more speed in the transmission of intelligence. Many interests demand it. Money, which represents labor, is continually lent and borrowed in bills of exchange, acceptances, deposits, and in actual cash sent across the seas. The length of time for passing the bills and correspondence, or the specie itself, thus becomes an exceedingly important item to those who are to use them, and consequently to the ultimate consumer for whom they are conducting the commercial transaction. What community would to-day tolerate the idea of sending three millions of dollars per week, and five millions of credits between England and the United States on a sailing ship of whatever quality, with the probability of keeping it lying unproductive on the ocean for thirty days? Extend this to weekly shipments of the same amounts, and have at one time on the waters between the two countries twelve

million dollars in specie and twenty in credits, tossing about the ocean, unproductive and unsafe, and entailing all of the evils incident to the uncertainty as to the time when it will arrive. But if this is not sufficient, extend the inquiry to South-America, and China, and India, and see how enormous and useless a waste of money and interest is incurred in the many millions which by sailing vessels and slow steamers is fruitlessly gilding the ocean for months. Money is too valuable and interest too high to keep so many millions of it locked up from the world. At two and three per cent a month, the nation, or, what is the same thing, its commercial and mercantile classes, as representing the producing, would soon become bankrupt.

The only avoidance of these evident evils is in a rapid transmission of the mails, specie, and passengers. And herein consists the chief value of the rapid ocean steamer. It is an important case which the Telegraph, with all of its benefits, can never reach. It can never transmit specie; neither the evidences of debt nor of property. The voluminous mails, with all of their tedious details, upon which such transactions depend, must go and come on steamers, and on steamers only. They have the certainty, which will satisfy men and prevent speculation, gambling, and imposition; they have the speed, which shortens credit, keeps specie alway in active use, and enables commercial men to know, meet, and supply the wants of the world before they become costly or crushing; and they give a rapid and comfortable transit to passengers, who can thus look after their business, and save much to themselves and to the producer and consumer. Compared with sailing vessels their efficiency is really wondrous.

Foreign correspondence was formerly very limited, and the interchange of interests, feelings, and opinions was slow and tedious. Each nation depended solely on itself; and instead of the brotherhood now prevailing, communicated through the costly channels of war, by messages of the cannon, and in powerful, hostile fleets. But the foreign correspondence of the world is really enormous, and rapidly increasing, since the introduction of ocean steamers; and no one will say that they have had a small share in producing that fraternal international spirit which is now so widely manifested in Peace Congresses, Congresses of the Five Powers, explanations, concessions, and amicable adjustments of difficulties. The peaceful influences and the civilization of the times are but another comment on the capabilities of steam.

There are also certain classes of freights which steam is better calculated than sailing vessels to transport; certain rich and costly goods which would either damage or depreciate if not brought speedily into the market. There are many articles also, as gold and silver ware, jewelry, diamonds, bullion, etc., and some articles of *vertu* as well as use, which are costly, and have to be insured at high values unless sent on steamers; and which consequently can pay a rather better price. As in the case of specie, they are too valuable to be kept long on the ocean; but in the general traffic of the world there is so little of this class of freight that steamers can place no reliance on it as a source of income. These freights have abounded most between France and England and the United States. This is the principal reason why the New-York and Havre line of mail steamers has run on so unprecedentedly small a subsidy; a sum not

more than half adequate to the support of a mail line but for that class of freights. The Cunard line has also derived a large sum of its support from the same source. All such articles passing by that line come from England, Ireland, and Scotland, where they are manufactured; and being shipped by British merchants, are given, as a matter of duty, to their own steamers. Another reason for the Cunard line getting most of those more profitable freights is that a steamer leaves every week; every Saturday; and shippers sending packages weekly are not compelled every other week to hunt up a new line, and open a new set of accounts, as would be the case if they attempted to ship by the Collins semi-monthly line.

These freights have hitherto proven a profitable source of income to that line. As there is no manufacturing done in this country for Europe, the Cunarders and the Havre as well as the Collins and Vanderbilt lines, have no freights that pay the handling from the United States to Europe. And not only has the Cunard line, by starting from home, taken all of these profitable freights from the Collins, but it has run a weekly line of propellers from Havre and taken the freight over to Liverpool free of charge for its New-York and Boston steamers, and thereby shared the freights and greatly reduced the income of the Havre line. There being a great superabundance of propeller stock in Great Britain, which can be purchased frequently at less than half its cost, and these vessels running the short distance between Havre and Liverpool very cheaply, (*See pages 108-13*,) the Cunarders have cut the Havre freights down from forty to fifteen dollars per ton, and sometimes for months together to ten dollars per ton. As a matter of course, this price would not pay the

handling and care of these costly articles; but at fifteen dollars it enabled the Cunard line to fill their ships and derive some profit; as most of them, with the exception of the *Persia*, run slowly, use less coal, and have more freight room. All of these freights are, however, small in quantity, and not much to be relied on from year to year, as will be seen below, in consequence of the action of propellers.

There is another class of business which mail steamers can do at remunerating prices; but which is exceedingly limited anywhere, and not at all known on some lines. This is in Express packages. They pay a high price; but seldom reach more than three or four tons under the most favorable circumstances. In the early stages of the California lines, when there was a rush of travel to the gold regions, and a hurried transit required for a thousand little necessaries of life, the New-York and Aspinwall and the Pacific Mail Steamship Company's lines transported a large express freight outward at every voyage, amounting sometimes to two hundred tons; but the golden days of such cargo have long gone by, and California is now supplied like the rest of the world by the cheaper and more deliberate transport of sailing vessels; and the steamers are left to their legitimate business of mails and passengers. Taking together all of the classes of freights which steamers having mail payment are capable of transporting, they amount at present to but an insignificant part of the income by which these steamers can be run. During the last six years these freights have reduced more than one hundred per cent; and goods which were then profitable to the steamer, are now taken only "to fill up." And the chief reason for this reduction arises not so much from competition

between the steam-lines, which well knew that they could not transport these freights when reduced to the present low prices, but from the introduction of a large number of propellers, some of which were originally designed for this species of trade, and many others which were built during the war in the Crimea for the transport of troops. These ships were never prosperous anywhere, and are in nearly all cases at the present found in second hands; the original proprietors having lost a large share of their investment. Thus, purchased cheaply, and running with simply an auxiliary steam power, and making the passages but little shorter than the sailing vessels, and not even so short as their best passages, they have but little more daily expense than the sailing vessels, with all of the deceptive advantages of being called steamers. They thus get these better freights and a large number of immigrants, which with small interest on prime cost enables them to live.

Paradoxical as it may seem, there are yet some cases, even upon the ocean, in which steam can transport freight cheaper than the winds of heaven. And this species of trade constitutes one of the best capabilities of steam power applied to navigation. It is not in the long voyage between Europe and America, or between the East and California, or yet in the far-off trade among the calms and pacific seas of the East-Indies and the Pacific Islands; it is not in the smooth, lake-like seas of the West-Indies, where there is no freight whose transport price will pay for putting it on and taking it off the steamer; nor in the trade of Brazil whence a bag of coffee can be transported five thousand miles to New-York nearly as cheaply as it can from New-York to Baltimore or to Charleston; but it is in the coasting trade of almost

every country, where the voyage is short. In the trade between New-York and Baltimore, between Charleston and Savannah, between Boston and Portland, or between New-Orleans and Key West, or New-Orleans and Galveston, the small sailing vessels spend one half of their time in working in and out of the harbors. Sometimes they are two days awaiting winds, to get out of a harbor, two days in sailing, and two days again in making and entering their port of destination; whereas a steamer would make the whole passage in one day to a day and a half. Now, the distance actually to be run, and for which the steamer will be compelled to burn coal is not very great; but the trouble of working the vessel in and out, against adverse winds and currents, and amid storms and calms, is sometimes excessive, while the delay and cost are disheartening. They have also the trouble of warping into and out of the docks, which is not the case with steamers.

Thus, it frequently takes a week for a sailing vessel to do the work that a steamer will readily do in twenty-four to thirty-six hours. Say that it takes the sail four times as long as the steamer to accomplish a given voyage. To do as much business as the steamer would do in the same time, would require four sailing vessels; four times as many men as one sail requires, or probably twice as many hands in the aggregate as the steamer would have; and would incur at least twice the expense of the steamer in feeding them. Now, there is also a much larger aggregate sum invested in these four sail, and the owners pay a much larger sum of interest on their prime investment. Or, in other words, the steamer with but a few more men, but little greater expense in living, a small coal-bill, an engineer and firemen,

and a prime outlay of not more than double the capital, will carry four times the freight and passengers, without incurring probably so much as three times the expense of one of the sail. After the prime cost the most important item of expenditure in one of these small steamers is the coal; but the distance run being so short, and getting into and out of the harbor and docks being so easy, the vessel does large execution at little expense. The two most essential benefits, however, of her short voyage are, that she is not compelled to carry much fuel, and consequently occupies nearly all of her space with freight; and that the prices of freight on these short voyages are much larger in proportion than they are on long voyages. Sailing vessels charge very little more for a thousand miles than they do for five hundred; but a steamer may have to charge nearly three times as much; especially if she run fast, consume much fuel, and occupy her cargo-room with coal. There are distances at which steamers, however large, can not carry a pound of freight; but occupy all their available space with the power that drives them. In these long voyages sail becomes much cheaper.

It is by no means essential that these small coasting vessels shall be propellers; for to acquire the same speed they expend the same power and have the disadvantage of being deeper in the water, and not being able to go into all harbors with much freight. They have also the advantage of carrying more sail, and being generally better able to stand coast storms than a side-wheel of light draught of water. They are not quite so expensive in prime construction, but generally require more repairs, and must be on the docks much oftener. They are, however, much better

suited than side-wheel vessels to voyages where a medium speed is required, and where the steam can be used at pleasure simply as an auxiliary power. In such cases there is a profitable economy of fuel. But speed has generally been deemed essential in this country, and the side-wheel is everywhere used. But entirely the contrary is the case in Great Britain and France. There the coasting business is conducted by screws almost altogether; and the speed does not transcend the limit of economy and commercial capability. They distinguish between the extremely fast carriage of mails and passengers on the one hand, and freights on the other; and although they wish the speed and certainty of steam, yet it is not the costly speed. When they know that a given quantity of fuel will carry freight eight knots per hour, they would consider it wasteful and foolish to consume twice that quantity of fuel just to carry it ten knots; and more especially so, when, in addition to the extra quantity of fuel, they would lose just its bulk in paying freight room. England is thus employing most of her vast fleet of coasting ocean steamers in her own trade, or in the foreign trade lying within a few hundred miles of her ports. And the voyages being short, her coals being cheap and convenient, frequently not above three dollars per ton to the coasters, and in addition to this, the prime cost of these vessels being smaller than in this country, as both iron and labor are cheaper, she has found them very profitable at home, and is insinuating them into all the short routes wherever she can get a foothold. It was not until she attempted the same species of self-supporting steam navigation with distant countries, that her propeller system failed her and involved her citizens in loss. Meanwhile it is more than probable that within the

next fifteen years we shall find five hundred propellers scattered along the coasts of the United States.

Notwithstanding the eminent capabilities of steam when applied to coast navigation, or to the fluvial navigation of the interior, it has failed to make the same triumphs in the carriage of freights and passengers upon the ocean. And it is not alone because the voyage is long and the freights low in price. Steamers carry freights up the Mississippi river two thousand miles from New-Orleans, and find it profitable. Some run even as high as three thousand miles up that river and the Missouri; a voyage nearly as long as to Europe, and make money by it. But the circumstances are very different. They do not leave the dock at New-Orleans with even more than enough fuel on board for the whole trip, as the ocean steamers do. If they did they could carry no freight. But they stop every twelve to eighteen hours and take on wood just as they need it, fifty to a hundred cords at a time; and instead of occupying all of their available room with wood, they have the steamer full of cargo, and have on board only fifty or sixty tons of fuel at a time, and only half that weight on an average. None of the best steamers on those rivers could take enough wood on board for the whole three thousand miles, even though they should not have a ton of freight. And compared with ocean steamers of the same engine power, they do not cost half of the money, I might say generally, not one third of the money. There is no reason, then, why these steamers should not carry large quantities of freight and make large sums of money by it. They have the great elements, fuel, freight capacity, and prime cost in their favor.

There is a large class of freights which are not transportable by steam on long ocean voyages under any conditions. We will grant that under the most favorable circumstances, where rich and costly articles are transported in small bulk, that propellers running at a low rate of speed, or just fast enough to anticipate sailing vessels, will make a living. But change the class of these freights into the great average class of those filling the thousands of sailing vessels, and deprive these screw vessels of an immense emigrant passenger traffic, and they would not pay their running expenses by fifty per cent. This style of freights, sailing vessels in their great competition have reduced to the lowest paying figure. The margin left for profit is so small that our ship-owners constantly complain that unless there are changes they must go into other business; and many of them say this honestly, as is shown by the hundreds of ships which of late years we can always find lying up, awaiting improvement in business. Now, let even the slowest and cheapest running screw vessel attempt to carry the same freights, to say nothing of fast side-wheel mail vessels, and we shall see against what odds the screw or other steamer has to contend. In the first place, her engines, boilers, coal, etc., occupy at least forty per cent of her total registered tonnage. Grant that the additional expense of a steamer over a sail, that is, wages for engineers, firemen, coal passers, etc., and finding the same in food and rooms, costs even no more than the loss of an additional ten per cent of her freight room. In other words, considering her steam machinery, fuel, extra expenses, etc., to be equal to half of her freight room, it is evident that she would carry only half as much freight as a sailing vessel of the same size, and that she would get but

half as much money for it.

It is thus clear, I think, that there is a certain class of ocean freights which steam can not transport under any conditions so long as there are sailing vessels on the ocean; and in that class are comprehended all the great standard and staple articles of the world, constituting in sum seventeen twentieths of all the freight passing upon the ocean. This being so, it is utterly idle to suppose that steam in any form can take the place of sail upon the ocean, even though the present prices for the carriage of standard articles should increase three hundred per cent.

There are many considerations which affect this question. The ordinary average passages of the ocean on long voyages are now very rapid; and some of the clippers have attained a speed which no freighting steamer may ever be expected to do on the high seas. They do not maintain this high speed as an average, but it is sufficiently high for all of the ordinary purposes of transport in the standard articles of commerce, and where the business of the clipper is done by a fast mail steamer. There is no positive necessity for the speedy transport that some have attempted to give to articles, whose presence in the markets, as the ordinary supplies of life, to-day, next month, or a month later, is a matter of total indifference to every one except the ship-owner himself. It but little concerns the public whether a cargo of cotton, or beef or pork, or corn is one month or forty-five days between the United States and England, so that it is safe in the end. It is an annual production that must have an annual transit, and however unnecessarily fast we may become, we can not send more than one crop in the year. The world frequently becomes too fast in every thing; and

crises, panics, and bankruptcies follow as legitimate consequences. When a fictitious value is given to every thing, and every globule of air which one has breathed comes puffing out, a splendid bubble, a magnificent speculation, and when men have to go so fast that they need a telegraph to ride them through the world lest they get behind the heated times, no wonder that the shipper can not sit quietly down in his office and wait thirty days for a load of corn to reach England, or a load of iron to appear in the harbor in return. And it does not matter to him that it may not be used there in six months. He wishes to finish the "operation," to close up the "transaction" before he goes up town in the evening.

There is a rational distinction between the necessary and the unnecessary which we must learn to make, and a limit which safety assigns to every operation. There are some things which must be done rapidly, and others which may be done at leisure. Between the freight cargo, and the correspondence which controls it there is a great difference. Rapid transport of letters, intelligence, and passengers, and leisure transport of freight, is the law of nature, and to attempt to reverse it is but to attempt that which will never be successfully done, simply because wholly unnecessary in any permanent economic sense. And not only is higher speed than that of clippers unnecessary in ordinary freight transport, but it is clearly impossible in any normal condition of trade. Circumstances may, and doubtless often will exist, which will require some sluggish article to be transported a long distance in a short time, as in the case of the famine in Ireland, and which may insure rates at which steam vessels can take small quantities of such freights; but such occasions will ever be

accidental, and the support of vessels depending on them the questionable support of expedients, and capricious in the extreme. It will ever be just as impossible to hurry gross freights across the ocean in a healthy state of commerce as it will to prevent rapid mails, or forego the comforts of quick passenger transit.

To say nothing of a vessel which is half filled with its own power, attempting to compete, in the ordinary freights of the world, with one which fills every square foot with paying cargo, it is equally important that we should look at the question of fuel. The coals of the world are not so plentiful or so cheap that we should consume whole pits in a year in unnecessary and unproductive service. They are already beginning to fail in many parts of the world, or to the same effect, are mined and brought to market at such increasing cost, and applied to so many new purposes day by day, that in a few years the price will place them entirely beyond the reach of commercial purposes upon the ocean. It is contended, however, that the science of engineering is also rapidly advancing, and that we shall soon have some discovery by which we can have heat without fuel, and power without heat. But I have heard of those imaginary engineering hopes so long that I begin to believe them vague, and that we shall yet for a few generations measure the power applied by the number of pounds of coal consumed. From past experiences and present indications we can predicate nothing with more certainty of fuel than that it will indefinitely increase in price. I am satisfied, therefore, that with all of the capabilities of steam it can never be applied to general ocean transportation; first, because undesirable; and

second, because impossible even if desirable. But to show more clearly that it is impossible, I will now make some inquiries concerning the cost of ocean steam, which is the cardinal point of interest in marine propulsion.

SECTION IV.

COST OF STEAM: OCEAN MAIL SPEED.

MISAPPREHENSION OF THE HIGH COST OF STEAM MARINE PROPULSION: VIEWS OF THE NON-PROFESSIONAL: HIGH SPEED NECESSARY FOR THE DISTANCES IN OUR COUNTRY: WHAT IS THE COST OF HIGH ADEQUATE MAIL SPEED: FAST STEAMERS REQUIRE STRONGER PARTS IN EVERY THING: GREATER OUTLAY IN PRIME COST: MORE FREQUENT AND COSTLY REPAIRS: MORE WATCHFULNESS AND MEN: MORE COSTLY FUEL, ENGINEERS, FIREMEN, AND COAL-PASSERS: GREAT STRENGTH OF HULL REQUIRED: ALSO IN ENGINES, BOILERS, AND PARTS: WHY THE PRIME COST INCREASES: THEORY OF REPAIRS: FRICTION AND BREAKAGES: BOILERS AND FURNACES BURNING OUT: REPAIRS TWELVE TO EIGHTEEN PER CENT: DEPRECIATION: SEVERAL LINES CITED; USES FOR MORE MEN: EXTRA FUEL, AND LESS FREIGHT-ROOM: BRITISH TRADE AND COAL CONSUMPTION:

THE NATURAL LAWS OF RESISTANCE, POWER,

AND SPEED, WITH TABLE: THE RESISTANCE VARIES AS IS THE SQUARE OF THE VELOCITY: THE POWER, OR FUEL, VARIES AS THE CUBE OF THE VELOCITY: THE RATIONALE: AUTHORITIES CITED IN PROOF OF THE LAW: EXAMPLES, AND THE FORMULÆ: COAL-TABLE; NO. I.: QUANTITY OF FUEL FOR DIFFERENT SPEEDS AND DISPLACEMENTS: DEDUCTIONS FROM THE TABLE: RATES AT WHICH INCREASED SPEED INCREASES THE CONSUMPTION OF FUEL: CONSUMPTION FOR VESSELS OF 2,500, 3,000, AND 6,000 TONS DISPLACEMENT: COAL-TABLE; NO. II.: FREIGHT-TABLE; NO. III.: AS SPEED AND POWER INCREASE FREIGHT AND PASSENGER ROOM DECREASE: FREIGHT AND FARE REDUCED: SPEED OF VARIOUS LINES: FREIGHT-COST: COAL AND CARGO; NO. IV.: MR. ATHERTON'S VIEWS OF FREIGHT TRANSPORT.

The foregoing arguments bring us to the conclusion that steam, however desirable, can not be profitably employed in commerce generally as an agent of transport; and that it is best applicable to the rapid conveyance of the mails, passengers, specie, and costly freights only. That this fact may be presented in a clearer light, and that we may see the almost incredibly high cost of rapid steaming, or the attainment of a speed sufficiently high for the carriage of important mails, it will be necessary to make some critical inquiries concerning the working cost of steam power, under any conditions, as applied to marine propulsion. Much misapprehension prevails on this point among nearly all classes of the people, and even among the rulers of the country whose action controls the destiny and uses of this valuable power. It is hardly to be expected, however, that gentlemen engaged actively in the all-engrossing

pursuits of business or of public life, with a thousand different sets of ideas to be matured on a thousand different subjects, such as demand the attention of Congress, and the Departments of the Executive Government, should be practically or even theoretically acquainted with a profession which requires years of close application and study, and a wide field of practical, daily observation and experience. It would be as absurd for unprofessional gentlemen of any class, as well from the walks of statesmanship and the Government as from those of quiet private life, to assume an acquaintance with the theory and practice of navigation, and the cost, embarrassments, and difficulties attending steamship enterprise, as it would for any two or three of them to enter an ocean steamer for the first time of their lives, and essay to work the engines and navigate the ship across the seas. The skill and knowledge requisite for such a task would require years of application; and it can not be reasonably supposed that those entirely unacquainted with the theory and parts of an engine, should know much about its capabilities, or the cost attending its use.

But there are approximate conclusions, readily applicable to practice, at which even the unprofessional can arrive with certainty and security on a proper presentation of the prominent facts and theories concerned; and that these may be given to the public in a reliable and intelligible form, for the removal of the doubts and obscurities which have hung around the subject, is the chief object of this publication. This inquiry becomes the more important as the speed of American steamers is proverbially beyond that of any other steam vessels in the world. From the first conception of fluvial and

marine steam propulsion by Fitch and Fulton, the public and the inventors themselves regarded the new application of this power with the more favor as it promised to be a means of shortening the long distances between the different parts of our own large country. And the same object has acted as a stimulus ever since to that increase of speed which has placed localities all over this country, hitherto days apart, now, probably, but as many hours. The slow trip through marshes and rivers, over hills and mountains, and by the meandering roads of the country, between New-York and Albany, once required from four to six days; but the attainment of twenty-five miles per hour in our fast river steamers has at length placed that capital within six hours of the Metropolis. And, as in this instance, so has the effort been throughout our whole country, and upon the ocean, until we have attained, both upon the rivers and the high seas, the highest speed yet known, notwithstanding the important fact that steamship building is a new and not fully developed species of enterprise in this country. We have already seen how imperatively the spirit of the age and the genius of our people demand rapid steam mails by both land and sea, and a rapid conveyance of passengers; and it would be unreasonable to suppose that if we required these for the development of our youth, they would be less necessary for the fruitful uses of manhood and maturity. It is abundantly evident that the American people are by nature and habit a progressive and unusually hurrying people; and it is not to be supposed that they will reverse this constitutional law of their nature in their attempts at ocean navigation.

To answer the question, "What is the cost of high,

adequate mail speed?" requires something more than an inquiry into the quantity of fuel consumed; although this is the principal element of its cost. We must consider that the attainment and maintenance of high speed depend upon the exertion of a high power; and that,

I. High speed and power require stronger parts in every thing: in the ship's build, the machinery, the boilers, and all of the working arrangements:

II. High speed and power require a larger outlay in prime cost, in material and building, for the adequate resistance required by such power:

III. High speed and power require more frequent and costly repairs:

IV. High speed and power require more watchfulness, a more prompt action, and consequently more persons:

V. High speed and power require more fuel, more engineers, more firemen, and more coal-stokers.

1. These propositions are nearly all self-evident to every class of mind. That a high speed attained through the exertion of a high power will require stronger parts in every thing that exerts a force or resists one, is as manifest as that a force necessary to remove one ton of weight will have to be doubled to remove two tons. In the prime construction of the hull this is as requisite as in any other part. The resistance to a vessel, or the concussion against the water, at a low rate of speed, will not be very sensibly felt; but if that speed is considerably increased and the concussion made quicker without a

corresponding increase in the strength of the frame and hull of the ship generally, we shall find the ship creaking, straining, and yielding to the pressure, until finally it works itself to pieces, and also disconcerts the engines, whose stability, bracing, and keeping proper place and working order depend first and essentially on the permanence and stability of the hull. If the resistance to a vessel in passing through the water increases as the square of the velocity, and if in addition to this outward thrust against the vessel it has to support the greater engine power within it, which has increased as the cube of the velocity, then the strength of the vessel must be adequate to resist without injury these two combined forces against which it has to contend.

The same increased strength is necessary also in the engines and boilers. It is admitted by the ablest engineers, and verified by practice, as will be shown in another part of this SECTION, that to increase the speed of a steamer from eight to ten knots per hour, it is necessary to double the power, and so on in the ratio of the cubes of the velocity. Suppose that we wish to gain these two knots advance on eight. It is evident that, if the boilers have to generate, and the engines to use twice the power, and exert twice the force, they must have also twice the strength. The boiler must be twice as strong and heavy; the various working parts of the engine must be twice as strong: the shafts, the cranks, the piston and other rods, the beams, the cylinders, the frame work, whether of wood or iron, and even the iron wheels themselves, with every thing in any way employed to use the power, overcome the resistance, and gain the speed. There is no working arrangement in any way connected with the propulsion of the ship that does

not partake of this increase; every pump, every valve, every bolt connected directly or indirectly with the engine economy of the ship.

2. In the second place, seeing that much greater strength of parts is required to overcome the increased resistance, it is equally evident that this high speed and power thus require a larger outlay in every point of the prime construction of the vessel and engines by which the speed is to be attained. The hull's heavier timbers cost a higher price according to size than the direct proportion of size indicates. Large and choice timbers are difficult to get, and costly. The hull must also be strengthened to a large extra extent by heavy iron strapping and bracing, which, unlike the rest, cost in the ratio of the material used. So with the engines. The shaft, which weighs twice as much, does not cost only twice as much, but frequently three or four or five times as much. This arises not from the weight of the metal, as is evident; but from the difficulty of forging pieces that are so large. The persons engaged in the forging and finishing of the immense shafts, cranks, pistons, etc., used in our first class steamers, frequently consider that the last and largest piece is the *chef d'œuvre* of the art, and that it will never be transcended, even if equalled again. They have expended all of their skill and ingenuity in the task, and have not succeeded sometimes until they have forged two or three new pieces. When a great work of this kind is done, it may be discovered in the turning, polishing, and fitting up, that it has at last a flaw, and that it will not do for the service intended. As a matter of course, it must be thrown aside and a new piece forged. This was but recently the case with one of the shafts of the "Leviathan," in England. So

with the shafts of the new Collins' steamer "Adriatic." They were forged in Reading, Pennsylvania, and in addition to their enormous prime cost had to incur that of shipment from the interior of Pennsylvania to the city of New-York. In all such cases the prime cost increases immensely, and to an extent that would hardly be credited by those not practically familiar with the subject.

3. Again, high or increased power and speed require more frequent and more costly repairs. Friction arises from the pressure of two bodies moving in opposite directions, and pressure results from the exertion of power, and in the ratio of the power applied. The amount of friction, therefore, is in the ratio of the power expended and of the extra weight of parts required for that power. But the effects of friction require a higher ratio when the power is greatly multiplied, as in the case of high speed. An immensely heavy shaft exerting an unusual force is certain to greatly heat the journals and boxes, and thus wear them away far more rapidly. Also a rapid motion of heavy parts of machinery, and the necessarily severe concussions and jarrings can not fail destroying costly working parts in the engine, and necessitating heavy and expensive repairs and substitutions. An ordinary engine working at a slow and easy rate, will not require one tenth the repairs necessary if it were working up to a high power and accomplishing a high speed. With any little derangement the engines can stop and the injury can be repaired before it reaches any magnitude. But with rapid mail packets the engines must run on, and the derangement which at first is small, will amount in the end, when the voyage is completed and the mails are delivered, to a sum probably ten or twenty

times as great as in the case of the vessel that stops and makes her repairs as she requires them. The exertion of a high mail power causes many costly parts to burn out from unrelieved pressure and friction, which would not be the case under other conditions. It is also nearly impossible for the best built engines in the world to make fast time without breaking some important part at every trip or two, or so cracking and injuring it from the continued strain, that a wise precaution requires its removal to make the steamer perfectly sea-worthy. Every practical man knows these difficulties, and every steamship owner estimates their importance according to the immense bills they occasion month by month, or the delays and losses which they cause unless he has expended large amounts of capital in providing other ships to take their place on such occasions of derangement.

Nor is the burning out of heavy brass, and composition, and steel pieces, or the breaking of large and troublesome parts in the engine the only source of repairs on a steamship. The boiler department is particularly fruitful in large bills of repairs, especially if it be necessary to attain a good mail speed. It stands to reason that if the whole ship can not be filled with boiler power, which with reasonably high fires, would give enough steam, then the boilers which are used must be exerted to their highest capacity, or the rapid speed can not be attained. Many suppose that the boilers may generate twice the quantity of steam without any appreciable difference in the wear and tear; but this is a decided error. For high speed, and what I mean by high speed is simply that which gives a sufficiently rapid transit to the mails, the fires must

be nurtured up to their highest intensity and every pound of coal must be burned in every corner of the furnaces which will generate even an ounce of steam. This continued heat becomes too powerful for the furnaces and the boilers, and they begin to oxidize, and burn, and melt away, as would never be the case under ordinary heat. When the ship comes into port it is found that her furnaces must be "overhauled," her grate bars renewed, her braces restored, her boilers patched, sometimes all over, several of their plates taken out, thousands of rivets removed and supplied, and probably dozens of tubes also removed and replaced with new ones. But this is not all. The best boilers can not long run in this way. After six to seven years at the utmost, they must be removed from the ship altogether, and new ones must be put into their place. This is also a most expensive operation. The boilers constitute a large share of the cost of the engine power. To put a new set of boilers in one of the Collins steamers will cost about one hundred and ten thousand dollars, and this must be done every six years. The boilers of the West-India Royal Mail Steamers, which run very slowly, last on an average, six years.[A]

> [A] Statement by Mr. Pitcher, builder, before the Committee of the House of Commons. Murray on the *Steam Engine*, p. 170, Second Edition.

But this is not all. To restore the boilers, a ship has to be torn literally almost to pieces. All of the decks in that part must be removed and lost; the frame of the ship cut to pieces; large and costly timbers removed, and altogether an expense incurred that is frightful even to the largest companies. To insure perfect safety and to gratify the wish of the public, this is

generally done long before it is strictly necessary, and when the boilers are in a perfectly good condition for the working purposes of ordinary speed. But precaution and safety are among the prerequisites of the public service, and must be attained at whatever cost. On slow auxiliary freighting steamers this would be by no means necessary. But the extent and cost of these repairs on steamers far exceed any thing that would be imagined. They are supposed to be twelve per cent. per annum of the prime cost of a vessel of ordinary speed, taking the whole ship's life together at twelve years at the utmost. Atherton in his "Marine Engine Construction and Classification," page 32, says of the repairs of steam vessels doing ordinary service in Great Britain, where all such work is done much cheaper than in this country: "By the Parliamentary evidence of the highest authorities on this point, it appears to have been conclusively established, that the cost of upholding steamship machinery has of late years amounted, on the average, to about £6 per horse power per annum, being about 12 per cent. per annum, on the prime cost of the machinery, which annual outlay is but one of the grand points of current expense in which steamship proprietors are concerned." Now, if these were the repairs of the slow West-India Royal mail steamers, which ran but 200 days in the year, and that at a very moderate speed, and in the machine shops of England, where at that time (previous to 1852) wages were very low, they can not be less in this country, on rapid mail steamers, where wages and materials are very high, and where marine engineering was then in its infancy.

There are some facts on this subject which prove the

positions here taken. The Collins steamers have been running but six years, and yet their repairs have amounted in all to more than the prime cost of the ships, or to about eighteen per cent. per annum. They were as well and as strongly built originally as any ships in the world, as appears from the report which Commodore M. C. Perry made to the Department regarding them, and from the fine condition of their hulls at the present time. Their depreciation with all of these repairs has not been probably above six per cent. per annum. They will, however, probably depreciate ten per cent. during the next six years, and at the age of twelve or fourteen years be unfit for service. The steamers Washington and Hermann, which had strong hulls, have been run eight years, and are now nearly worthless. Their depreciation has been at least ten per cent. The steamers Georgia and Ohio, which Commodore Perry and other superintending navy agents pronounced to be well-built and powerful steamers, (*See Report Sec. Navy*, 1852,) ran only five years, and were laid aside, and said to be worthless. With all of the repairs put upon these ships, which were admitted to be capable of doing first class war service, as intended, they depreciated probably seventeen per cent.; as it is hardly possible that their old iron would sell for more than fifteen per cent. of their prime cost. These steamers paid much smaller repair bills than the Collins, and were not so well constructed, or at so high a cost. American steamers do not, upon the average, last above ten years; but if they reach twelve or fourteen, they will pay a sum nearly equal to twice their cost, for repairs and substitutions. Nor is this all. The life of a steamer ends when her adaptation to profitable service ceases. She may not be rotten, but may be so slow, or

of so antiquated construction, or may burn so much more fuel than more modern competitors, that she can not stand the test of competition.

4. We thus see that not only are the requisite repairs most extensive and costly, but of such magnitude as to greatly reduce the earnings of any class of steam vessels. But this is not the last costly consequence of mail speed. It requires more cautious watchfulness of the engines, the boilers, the deck, and of every possible department of the navigation, even including pilotage. It requires also more promptness and dispatch in every movement, and hence a much larger aggregate number of men. More men are necessary to keep up high fires; twice as many men are necessary to pass twice as much coal; twice as many engineers as under other circumstances are necessary for the faithful working of the engines, and any accidents and repairs which are indispensable on the ocean; and a larger number of sailors and officers is necessary to all of the prompt movements required of the mail steamer. The Havre mail steamers, the "Arago" and "Fulton," never carry less than six engineers each, although they could be run across the ocean with three under a hard working system. But this number insures the greater safety of the ship under ordinary circumstances, and is absolutely necessary in any case of accident and danger. It is the same case with the firemen. When, in a heavy storm, the fire department may be imperfectly manned, the ship has taken one of the first chances for rendering the engines inefficient, and being finally lost. And all of these extra and indispensable *employées* make an extra drain on the income of the ship, and add to the extreme costliness of a high adequate mail speed.

5. It is clear, then, that an adequate mail speed requires more fuel, more engineers, more firemen, more coal-stokers, and more general expense. The question of fuel is, however, alone the most important of all those affecting the attainment of high speed, and the item whose economy has been most desired and sought, both by those attempting to carry freight, and those who carry the mails and passengers. The principal points of interests concerning it are, the enormous quantity which both theory and practice show to be necessary to fast vessels; the large sum to be paid for it, and the steadily increasing price; and the paying freight room which its necessary carriage occupies. In fast steaming, the supply of coal to the furnaces frequently arrives at a point where many additional tons may be burned and yet produce no useful effect or increase of power. The draft through the furnaces and smoke stacks is so rapid and strong as to take off a vast volume of heat; and this, coupled with a large quantity of heat radiated from the various highly heated parts and surfaces, requires a consumption of fuel truly astonishing. If we reflect that at the twelve principal ports of Great Britain in the year of 1855, the tonnage entered was 6,372,301, and departed 6,426,566, equal to 12,798,867 total, and this during the war, that a large part of this was steam tonnage, and that the total imports and exports of Great Britain for 1856 were 1,600,000,000 dollars, we can somewhat appreciate the present and future uses of coal, and its inevitably large increase in price. The two hundred and seventy steamers in the British Navy, with about 50,000 aggregate horse power, consumed in 1856, according to a report made to a Committee of the "British Association for the Advancement of Science," this year, by Rear-Admiral

Moorsom, 750,000 tons of coal. The difficulty and cost of mining coal, its distance from the sea-shore, and the multifarious new applications in its use among our rapidly increasing population, as well as its almost universal and increasing demand for marine purposes, all conspire to make it more costly from year to year; while, as a propelling agent, it is already beyond the reach of commercial ocean steam navigation. Coal has gone up by a steady march during the last seven years from two and a half to eight dollars per ton, which may now be regarded as a fair average price along our Atlantic seaboard. And that we may see more clearly how essentially the speed and cost of steam marine navigation depend upon the simple question of fuel alone, to say nothing further of the impeding causes heretofore mentioned, I will now present a few inquiries concerning

THE NATURAL LAWS OF RESISTANCE, POWER, AND SPEED,

WITH TABLES OF THE SAME.

The resistance to bodies moving through the water increases as the square of the velocity; and the power, or coal, necessary to produce speed varies or increases as the cube of the velocity. This is a law founded in nature, and verified by facts and universal experience. Its enunciation is at first startling to those who have not reflected on the subject, and who as a general thing suppose that, if a vessel will run 8 miles per hour on a given quantity of coal, she ought to run 16 miles per hour on double that quantity. I think that it may be safely asserted that in all cases of high speed, and ordinary dynamic

or working efficiency in the ship, the resistance increases more rapidly than as the squares. The *rationale* of the law is this: the power necessary to overcome the resistance of the water at the vessel's bow and the friction increases as the square; again, the power necessary to overcome the natural inertia of the vessel and set it in motion, increases this again as the square of the velocity, and the two together constitute the aggregate resistance which makes it necessary that the power for increasing a vessel's speed shall increase as the cube of the velocity. But whatever the *rationale*, the law itself is an admitted fact by all theoretical engineers, and is proven in practice by all steamships. In evidence of this, I will give the following opinions.

In his treatise on "The Marine Engine," Mr. Robert Murray, who is a member of the Board of Trade in Southampton, England, says in speaking of the "Natural law regulating the speed of a steamer," page 104: "These results chiefly depend upon the natural law that *the power expended in propelling a steamship through the water varies as the cube of the velocity*. This law is modified by the retarding effect of the *increased resisting surface*, consequent upon the weight of the engines and fuel, so that the horse power increases in a somewhat higher ratio than that named." It must be understood that when he speaks of power, horse power, etc., it is simply another form of representing the quantity of coal burned; as the power is in the direct ratio of the quantity of fuel.

Bourne, the great Scotch writer upon the Screw Propeller, in his large volume published by Longmans, London, page 145, says, in concluding a sentence on the expensiveness of vessels: "Since it is known that the resistance of vessels increases more

rapidly than the square of the velocity in the case of considerable speeds."

Again, at page 236, on "the resistance of bodies moving through the water," he says: "In the case of very sharp vessels, the resistance appears to increase nearly as the square of the velocity, but in case of vessels of the ordinary amount of sharpness the resistance increases more rapidly than the square of the velocity."

Again, on page 231, in speaking of the folly of a company attempting to run steamers sufficiently rapidly for the mails at the price paid for them, he says: "At the same time an increased rate of speed has to be maintained, which is, of course, tantamount to a further reduction of the payment. In fact, their position upon the Red Sea line is now this, that they would be better without the mails than with them, as the mere expense of the increased quantity of fuel necessary to realize the increased speed which they have undertaken to maintain, will swallow up the whole of the Government subvention. *To increase the speed of a vessel from 8 to 10 knots it is necessary that the engine power should be doubled.*" This work of Mr. Bourne is now the standard of authority on the subject of which he treats, the world over.

Again, Mr. James R. Napier, of London, known as one of the largest and most skilled engine-builders in Great Britain, in the discussion of the dynamic efficiency of steamships in the proceedings of the "British Association" in 1856, page 436, says: "*The power in similar vessels, I here take for granted, at present varies as the cube of the velocity.*" The power simply represents the coal; in fact, it is the coal.

Mr. Charles Atherton, the able and distinguished Chief Engineer of Her Majesty's Royal Dock Yard, at Woolwich, has published a volume, called "Steamship Capability," a smaller volume on "Marine Engine Classification," and several elaborate papers for the British Association, the Society of Arts, London, the Association of Civil Engineers, and the Artisans' Journal, for the purpose of properly exposing the high cost of steam freight transport as based on the law above noticed, and the ruinous expense of running certain classes of vessels of an inferior dynamic efficiency. When but a few weeks since in London, I asked the Editor of the "Artisan," if any engineer in England disputed the laws relative to power, on which Mr. Atherton based his arguments. He replied that he had never heard of one who did. I asked Mr. Atherton myself, if in the case of the newest and most improved steamers, with the best possible models for speed, he had ever found any defect in the law of, the resistance as the squares, and the power as the cubes of the velocity. He replied that he had not; and that he regarded the law as founded in nature, and had everywhere seen it verified in practice in the many experiments which it was his duty to conduct with steam vessels in and out of the Royal Navy. I think, therefore, that with all of these high authorities, the doctrine will be admitted as a law of power and speed, and consequently of the consumption of coal and the high cost of running steamers at mail speeds.

It is not my purpose here to discuss this law, or treat generally or specially of the theory of steam navigation. It will suffice that I point out clearly its existence and the prominent methods of its application only, as these are necessary to the

general deduction which I propose making, that rapid steamships can not support themselves on their own receipts. The general reader can pass over these formulæ to p. 69, and look at their results.

I. TO FIND THE CONSUMPTION OF FUEL NECESSARY TO INCREASE THE SPEED OF A STEAMER.

Suppose that a steamer running eight miles per hour consumes forty tons of coal per day: how much coal will she consume per day at nine miles per hour? The calculation is as follows:

$8^3 : 9^3 :: 40$: required consumption, which is, 56.95 tons. Here the speed has increased $12^1/_2$ per cent., while the quantity of fuel consumed increased $42^1/_2$ per cent.

Suppose, again, that we wish to increase the speed from 8 to 10, and from 8 to 16 miles per hour. The formula stands the same, thus:

Miles.		**Miles.**		**Tons Coal.**		**Tons Coal.**
8^3	:	10^3	::	40	: x, =	78.1
8^3	:	16^3	::	40	: x, =	320.

II. TO FIND THE SPEED CORRESPONDING TO A DIMINISHED CONSUMPTION OF FUEL.

Murray has given some convenient formulæ, which I will here adopt. Suppose a vessel of 500 horse power run 12 knots per hour on 40 tons coal per day: what

will be the speed if she burn only 30 tons per day? Thus:

	40 : 30 :: 12^3 :		V^3 (or cube of the required velocity,)
Or, reduced,	4 : 3 :: 1728 :		V^3,
Equation,	$3 \times 1728 = 5184$	=	$4V^3$,
	Or, $^{5184}/_{4}$	=	
	$\sqrt[3]{1296} = 10.902$ knots	=	V, required velocity.

Thus, we reduce the quantity of coal one fourth, but the speed is reduced but little above one twelfth.

III. RELATION BETWEEN THE CONSUMPTION OF FUEL, AND THE LENGTH AND VELOCITY OF VOYAGE.

The consumption of fuel on two or more given voyages will vary as the square of the velocity multiplied into the distance travelled. Thus, during a voyage of 1200 miles, average speed 10 knots, the consumption of coal is 150 tons: we wish to know the consumption for 1800 miles at 8 knots. Thus:

150 tons : C required Consumption :: 10^2 knots × 1200 miles : 8^2 knots × 1800 miles.

Then,	C × 100 × 1200	=	150 × 64 × 1800,*
Or,	C × 120,000	=	17,280,000
Reduced to	C = $^{1728}/_{12}$	=	144 tons consumption.

Suppose, again, that we wish to know the rate of speed for 1800 miles, if the coals used be the same as on another voyage of 1200 miles, with 150 tons coal, and ten knots speed:

We substitute former consumption, 150 tons for C, as in the equation above, marked *, and V^2 (square of the required velocity) for 64, and have,

$$\begin{aligned} 150 \times 100 \times \frac{}{1200} &= 150 \times V^2 \times 1800, \\ \text{Or,}\quad 120{,}000 &= 1800V^2, \\ \text{Reduced,}\quad {}^{1200}/_{18} &= V^2, \\ \text{And}\quad V &= \sqrt{66.66} = 8.15 \text{ knots.} \end{aligned}$$

From the foregoing easily intelligible formulæ we can ascertain with approximate certainty the large quantity of coal necessary to increase speed, the large saving of coal in reducing speed, as well as the means of accommodating the fuel to the voyage, or the voyage to the fuel. It is not necessary here to study very closely the economy of fuel, as this is a question affecting the transport of freight alone. When the mails are to be transported, economy of fuel is not the object desired, but speed; and, consequently, we must submit to extravagance of fuel. This large expenditure of coal is not necessary in the case of freights, as they may be transported slowly, and, consequently, cheaply. But one of the principal reasons for rapid transport of the mails is that they may largely anticipate freights in their time of arrival, and consequently control their movements.

I recently had an excellent opportunity of testing the large quantity of fuel saved on a slight reduction of

the speed, and give it as illustrative of the law advanced. We were on the United States Mail steamer "Fulton," Captain Wotton, and running at 13 miles per hour. Some of the tubes became unfit for use in one of the boilers, and the fires were extinguished and the steam and water drawn off from this boiler, leaving the other one, of the same size, to propel the ship. An intelligent gentleman who happened to know that we were using only one boiler, and consequently, but half the power, remarked to me that it was very strange that the ship was still going about eleven miles per hour, without any sail. He said: "It is strange, sir; two boilers of equal size drove us thirteen miles per hour; and here now but one boiler drives us nearly eleven miles, or nearly as fast; when common-sense teaches that the one boiler would drive us only six and a half miles per hour. How is that?" I then explained to him very clearly the natural law relative to power and speed, (*See Rule II., page 68*,) which he at once comprehended and admitted, but with the remark: "Indeed, sir, I would have testified that she ought with one boiler to have gone at only half the speed; or that going at six miles with one boiler, she would go twelve with two."

As it will be interesting to the general reader to examine the details of the increased consumption of fuel at increased rates of speed, I present the following elaborate table recently prepared by Mr. Atherton for his new edition of "Steamship Capability," according to the formula above noticed, and the performance of the best type of vessel in the Royal Navy, the steamer "Rattler." Mr. A. found a higher efficiency in this vessel per horse power than any other in the Navy, and consequently based the

consumption of coal in the table on the assumption that the mail and passenger vessels generally should be of as good contractive type as "Rattler." I shall present also another table showing a much larger consumption of fuel by an inferior type of vessel. I use these tables because they are thoroughly correct, and quite as perfect as any that I could construct on the same formula; and because they carry with them the weight of probably the highest authority in Great Britain.

COAL TABLE: No. I.

Displacement,[B] Speed, and Fuel consumed per Day, for Mail, Passenger, and Freight Steamers, whose locomotive performance is equal to that of the best class of ocean steam vessels; assuming the consumption of fuel to be $4^1/_2$ lbs. per indicated horse power per hour, equal to 33,000 lbs. raised one foot in one minute. The quantity consumed is expressed in tons per day of 24 hours.

[B] Displacement refers to the number of cubic feet of water displaced by the hull; allowing thirty-five cubic feet to the ton.

SHIP'S DISPLACEMENT.					
	6	7	8	9	10
TONS.	TONS	TONS	TONS	TONS	TONS
100	1.04	1.65	2.47	3.51	4.82
125	1.20	1.92	2.86	4.07	5.59
150	1.36	2.16	3.23	4.60	6.31
175	1.51	2.40	3.58	5.10	7.00
200	1.65	2.62	3.91	5.57	7.65
250	1.92	3.04	4.54	6.47	8.87
300	2.25	3.44	5.13	7.30	10.0
350	2.40	3.81	5.68	8.09	11.1
400	2.62	4.16	6.21	8.85	12.1
450	2.84	4.50	6.72	9.57	13.1
500	3.04	4.83	7.21	10.3	14.1
600	3.43	5.46	8.14	11.6	15.9
700	3.81	6.05	9.02	12.8	17.6
800	4.16	6.61	9.87	14.0	19.3
900	4.50	7.15	10.7	15.2	20.8
1000	4.83	7.67	11.4	16.3	22.4
1250	5.60	8.90	13.3	18.9	26.0
1500	6.33	10.0	15.0	21.4	29.3
1750	7.01	11.1	16.6	23.7	32.5
2000	7.66	12.2	18.2	25.9	35.5
2500	8.89	14.1	21.1	30.0	41.2
3000	10.0	16.0	23.8	33.9	46.5
3500	11.1	17.7	26.1	37.6	51.5
4000	12.2	19.3	28.8	41.1	56.3

5000	14.1	22.4	33.5	47.7	65.4
6000	15.9	25.3	37.8	53.8	73.8
7000	17.7	28.1	41.9	59.6	81.8
8000	19.3	30.7	45.8	65.2	89.4
9000	20.9	33.2	49.5	70.5	96.7
10000	22.4	35.6	53.1	75.6	104
12500	26.0	41.3	61.7	87.8	120
15000	29.4	46.6	69.6	99.1	136
20000	35.6	56.5	84.4	120	165
25000	41.3	65.6	97.9	139	191
30000	46.6	74.0	111	157	216

By the inspection of this table we can see in condensed form the coal-cost of any speed as high as twenty miles per hour, and for any size of vessel from one hundred tons to thirty thousand tons. Let us find in the left hand column a vessel of 2,500 tons displacement. Pursuing the line along to the right we find in the second column 8.89 tons of coal, which a steamer of this displacement would burn in 24 hours, if running, as indicated at the head of the column, 6 Nautical miles per hour.

In the next column, under the head of 7 Nautical miles per hour, we find that she would burn in one day 14.1 tons; or one and a half times as much coal to gain one sixth more speed:

Again, at 8 miles per hour she burns 21.1 tons; nearly three times as much as at six miles:

At 9 miles she burns 30 tons: above twice as much as at 7, and nearly four times as much as at 6, although the speed is but half doubled:

At 10 miles per hour she burns 41.2 tons; about twice as much as at 8 miles, although the speed is increased only one fourth. At 10 she burns 34 per cent. more than at 9, although the increase of speed is only eleven per cent. (*See pages 67 and 68*):

At 11 miles per hour she will burn 54.8 or 55 tons; nearly three times as much as at 8 miles per hour, and six times as much as at 6 miles per hour:

At 12 miles per hour she will burn 71.2; about thirty per cent. more than at eleven miles per hour, although gaining but 9 per cent. in speed; nearly twice as much as at ten miles per hour, three and a half times as much as at 8, five times as much as at 7, and above eight times as much as at 6 miles per hour. It is here seen that to double the speed the consumption of fuel has increased eight-fold, which verifies my statements hitherto made on this subject. We have already seen that to gain two miles of speed on any stated speed, it was necessary to double the quantity of fuel used.

At 13 miles per hour she burns 90.5 tons. This is burning two and a fourth times as much coal as if she ran only 10 miles per hour. Now, at this speed, the steamer will reach Southampton or Liverpool in 10 days and 6 hours, which is equivalent to 10 days and 12 hours burning fuel, allowing six hours for heating and starting, and which would make an aggregate consumption of 950 tons of coal for the passage of this steamer of 2,500 displacement or probably 3,000 tons register.

At 14 miles per hour she burns 113 tons. This is nearly three times as much as 10 miles per hour. At this speed the steamer would reach Southampton or

Liverpool in 9 days, 12 hours, and 30 minutes, supposing the distance to be 3,200 miles from New-York, or say 9 days $18^1/_2$ hours coal-burning time, and would consume an aggregate of $1{,}104^1/_2$ tons. As this is but little above the distance from New-York to Southampton, and under that from Panamá to California, and about the tonnage of the steamers running, the time being within eleven days generally, it will be seen how large is the cost of running the steamers of the Pacific Mail Steamship Company, those on the European routes, and also those between New-York and Aspinwall. As the route of the Havre and Bremen steamers is much longer, they are compelled to run slightly slower, or they would be filled up with their own fuel and power. Taking a Collins steamer of 3,000 tons, which we find in the line below, and we see that in running 14 miles per hour as they have frequently done, the consumption would be 128 tons per day, or 1,252 tons for the passage. And yet, one of those steamers could make 12 miles per hour on 80.4 tons per day, or at 11 miles per hour on 61.9, or less than half that used at 14. But pursuing this table we see that,

At 15 miles per hour she would burn 139 tons, or three and a half times as much as at 10 miles.

At 16 miles per hour she would burn 169 tons, or precisely eight times as much as at 8 miles per hour. Here again doubling the speed is found to be an enormous expense.

At 17 miles per hour she burns 202 tons per day.

At 18 miles per hour the consumption is 240 tons per day.

At 19 miles per hour she burns 283 tons coal per day; and

At 20 miles per hour she burns 329 tons per day. At 20 miles per hour she would run 480 miles per day, a thing as yet wholly unheard of, and would consume on the voyage of 6 days and 16 hours, say 6 days and 22 hours, 2,276 tons of coal. It would be clearly impossible for her to carry her own fuel; as the immense boiler and engine power necessary to secure this speed would of itself fill a ship of this size, to say nothing of the fuel which also would nearly fill it. Then, we may never expect any such ship to attain any such speed as seventeen, eighteen, or twenty miles per hour on so long a voyage without recoaling.

Seeing thus the enormous increase in the consumption of fuel for a moderate increase in the speed, we are enabled the better to appreciate the large expense incurred in running ocean steamers sufficiently rapidly for successful mail and passenger purposes. We will further pursue these inquiries by examining in this table the consumption for vessels of 6,000 tons, which would make the displacement of the ship nearly 5,000 tons, such as the "Adriatic," the "Vanderbilt," and the "Niagara." It appears that at 8 miles per hour they would consume 33 tons per day; at 10 miles, 65 tons; at 12 miles, 113 tons; at 13 miles, 144 tons; at 14 miles, 179 tons; at 15 miles, 221 tons; and at 16 miles, 268 tons per day. This is supposing this speed to be maintained on an average across the ocean, in all kinds of weather, which this size of steamer could not do without more engine and boiler power than any of them have. With such additional power the ships noticed would have scarcely any available room for freight or any thing

else. One thing is very clear from this table, that when steamers run at very moderately slow rates of speed, their consumption of fuel is very small; and that when they leave this low freighting speed, for that of the necessarily rapid mails and passengers, the consumption increases to an extent and with a rapidity that would seem almost incredible at first view.

COAL TABLE: No. II.

The following coal table is constructed in all respects as the preceding, but for a lower type of vessels, or those whose coëfficient of Dynamic performance is inferior to that upon which the previous table is estimated. As a consequence, this style of vessel requires more fuel.

SHIP'S DISPLACEMENT.					
	6	7	8	9	10
TONS.	TONS	TONS	TONS	TONS	TONS
500	3.95	6.28	9.37	13.4	18.3
600	4.46	7.10	10.6	15.1	20.6
700	4.95	7.86	11.7	16.6	22.8
800	5.41	8.59	12.8	18.2	25.1
900	5.85	9.29	13.9	19.7	27.0
1000	6.28	9.97	14.8	21.2	29.1
1250	7.28	11.5	17.3	24.5	33.8
1500	8.23	13.0	19.5	27.8	38.1
1750	9.11	14.4	21.5	30.8	42.2
2000	9.95	15.8	23.6	33.6	46.1
2500	11.5	18.3	27.4	39.0	53.5
3000	13.0	20.8	30.9	44.0	60.4
3500	14.4	23.0	34.3	48.8	66.9

4000	15.8	25.1	37.4	53.4	73.2
5000	18.3	29.1	43.5	62.0	85.0
6000	20.6	32.9	49.1	69.9	95.9
10000	29.1	46.2	69.0	98.2	135

FREIGHT TABLE: No. III.

Showing the mutual relation of Displacement, Power, Speed, Consumption of Coal, and capacity for Cargo of vessels of progressively increasing magnitude up to nearly 30,000 tons of Deep-draught Displacement, employed on a passage of 3,250 nautical miles, without recoaling: showing also the prime cost Expenses per ton of Cargo conveyed.

Mean or Mid-passage Displacement.	Speed.	POWER.		Assume weigh of Hul and Engine
		Nominal H. P.	Indicated h. p.	
Tons.	N. M.	H. P.	h. p.	TONS
2,500	8	109	436	1109
	9	155	620	1155
	10	213	852	1213
	11	284	1136	1284
	12	368	1472	1368
5,000	8	172	688	2172
	9	245	980	2245
	10	336	1344	2336

	11	448	1792	2448
	12	581	2324	2581
	8	276	1104	4276
	9	388	1552	4388
10,000	10	536	2144	4536
	11	712	2848	4712
	12	928	3712	4928
	13	1180	4720	5180
	14	1472	5888	5472
	8	436	1744	8436
	9	620	2480	8620
20,000	10	852	3408	8852
	11	1136	4544	9136
	12	1472	5888	9472
	13	1872	7488	9872
	14	2340	9360	10340

Mr. Atherton gives this table, which shows the following facts:

That, as the various sized vessels named, increase in speed from 8 to 12, or from 8 to 14 miles per hour, their horse power, as well consequently as their coal, increases:

That, as the speed increases, so does the weight of the hull and engines:

That, as the speed increases, with the consequent increased coal and engine weight, the cargo decreases: and

That, as the speed increases, with the other necessary conditions noticed, the expense per ton of cargo also increases in a rapid ratio. In the four cross columns

ships of different sizes are considered; of 2,500, 5,000, 10,000, and 20,000 tons. There is also given the working or indicated horse power, and the nominal horse-power, or that of 33,000 lbs. raised a foot in a minute, which is the general basis of making contracts. It is a fact, however, that engines generally work up to three or four times their nominal horse power; so that the word horse power has no positive or useful meaning. Vessels called one hundred nominal horse-power have been known to work up to six hundred.

Let us take a ship of 5,000 tons. We find that at 8 miles per hour the horse power is 436; but at 12 miles it is 1,472, nearly four times as great. At 13 miles, it would be nearly 1800 horse, and at 14 it would be above 2100. So, also, with the weight of engines, boilers, etc. At 8 miles per hour they would weigh 1,109 tons; but at 12 they would have to weigh, to be large and strong enough, 1,368 tons. At 14 miles, they would weigh nearly 1,600 tons.

Now, see the columns "cargo" and "coal," and observe how rapidly that of coal increases, while that of cargo decreases in the inverse ratio of the coal, the engine, the boiler, and the hull weight combined. The cargo has come from 1,209 down to 717 tons; and if the speed were increased to 13 or 14 miles per hour, the cargo would be so reduced as to be unworthy of notice.

The next column shows how much greater the quantity of water displaced as the speed increases. This extra displacement requires extra power.

In the last column it is observable how rapidly the speed enhances the cost price of transporting cargo.

At 13 miles per hour the cost would be about six pounds sterling per ton, and at 14 knots speed it would be higher than was ever paid a steamer in the most flush periods of even the best qualities of freights. Freights were about £8 per ton on the Cunard line before the establishment of the Collins; but they soon came down, and are not now £3, or $15, on an average. So with passage. The "Great Western" charged £45, the "British Queen" £50; the Cunarders, until the Collins competition, £40, 19*s.* The Collins steamers put the price down to £35, and have since reduced it to £30 homeward, and £24 outward. This is but little above half the fare of the Great Western, and something over two thirds of that formerly charged by the Cunard line. The Report to the House of Commons "on Steam Communications with India," No. 372 of 1851, second volume, page 395, says, that the average speed of the Cunard line was 10.443 knots, of the Collins line 11 knots, and of the Havre and Bremen lines 9.875 knots per hour. The Collins line had then just started, and has since made the average passages one and a half days quicker than those of the Cunard line. This being the case, it is easy to estimate the gains of a steamer at such rates, when this column shows us that at 12 miles speed per hour and an average trip of 11 days, the actual prime cost of moving the freight is much above that which is received for it. It is therefore taken in small quantities only to assist in paying the running expenses of the steamer.

This table shows another thing very conclusively, that large ships running the same number of miles per hour, run cheaper and transport freight more cheaply than smaller vessels. It presupposes, however, that they go full both ways. The engine

power and general outlay do not increase as rapidly as the tonnage of the vessel and her capacity for carrying. While a ship 2,500 tons at 12 miles per hour on a passage of 3,250 miles would make the cost per ton for the transportation of freight $22.75, one of 20,000 tons, under the same conditions would reduce it to $9 per ton. Yet it is hardly probable that we shall ever profitably employ steamers of over 10,000 tons tonnage in the passenger, mail, and freight business.

Again, a ship of 2,500 at 12 miles, running 6,500 miles could not transport cargo at less than $115; one of 5,000 tons would transport it at $52; one of 10,000 tons would transport it at $33 per ton; and one of 20,000 tons burthen, as for instance the "Leviathan," would transport it at $24 per ton. And while none of the three first named sizes of vessels would transport it 12,500 miles, the one of 20,000 tons, running 12 miles per hour, would transport it at $80 per ton; and running 14 miles per hours, at $430 per ton. Two things must, however, not be forgotten in this; that the ship to do this must always run entirely full and have no waste room; and that these prices are comparisons between different steamers, and not with sailing vessels, which, running much more slowly and with but little expense, transport the freight far more cheaply.

The following table will set forth very clearly in a summary view, the Time, Horse-power, Coal, and Cargo for a steamer of good average quality running on passages of 1,000 miles, 2,000 miles, and 3,000 miles, and at a speed varying from 6 to 18 miles per hour. It will be observed that a steamer of 3,000 tons can not take power and coal enough to run on a 2,000 miles passage above 17 knots per hour, and

that one of 3,000 tons also can not run on a 3,000 miles passage at a speed above 16 knots per hour. Observe the small quantity of cargo and the large quantity of coal for a steamer of 3,000 tons on a 3,000 miles passage at 16 miles per hour.

COAL AND CARGO TABLE: No. IV.

Calculated for the mean Displacement of 3,000 Tons.

SPEED —per hour.	Horse-power.	Weight of Hull and Engines.	PASSAGE 1,000 Nautical Miles.			
			Time.	Coal.	Cargo.	Ti
N. M.	H. P.	TONS.	D. H.	TONS	TONS	D
6	52	1252	6.23	72	1711	1
7	83	1283	5.23	98	1667	1
8	123	1323	5. 5	128	1612	1
9	175	1375	4.15	162	1543	9
10	241	1441	4. 4	200	1458	8
11	320	1520	3.19	242	1358	7
12	416	1616	3.11	288	1239	6
13	529	1729	3. 5	339	1100	6
14	661	1861	2.23	393	942	5
15	813	2013	2.19	451	761	5
16	987	2187	2.14	514	555	5
17	1183	2383	2.11	580	327	4
18	1405	2605	2. 8	650	69	
19	1652	2852				
20	1927	3127				

I will close this long chapter, in which I have endeavored to give a clear, comprehensible, and faithful idea of the cost of running ocean mail, freight, and passenger steamers, by an extract from that very able and faithful work, "Steamship Capability." As a summing up of the various laws and facts concerning the consumption of fuel, weight and power of engines, speed of ships, and their capacity to do business, Mr. Atherton says, page 55: "Now suppose, for example, that the passage be 1,000 miles, and that, for brevity, we confine our remarks to the engine department only; which, indeed, will be the department of expense, chiefly affected by variations in the rate of speed. It appears that the vessel of 5,000 tons' mean displacement, if fitted to run at the speed of EIGHT NAUTICAL MILES per hour, will require 172 H.P., and a cargo of 2,738 tons will be conveyed 1,000 miles in five days five hours; being equivalent to one day's employment of $^{33}/_{100}$ H.P. *per ton* of goods.

"If fitted to run at TEN NAUTICAL MILES an hour, the vessel will require 336 H.P., the cargo will be reduced to 2,524 tons, and the time to four days four hours; being equivalent to one day's employment of $^{55}/_{100}$ H.P. *per ton* of goods nearly.

"If fitted to run at TWELVE NAUTICAL MILES an hour, the vessel will require 581 H.P., the cargo will be reduced to 2,217 tons, and the time to three days eleven hours; being equivalent to one day's employment of $^{91}/_{100}$ H.P. *per ton* of goods.

"If fitted to run at FOURTEEN MILES an hour, the vessel will require 923 H.P., the cargo will be reduced to 1,802 tons, and the time to two days twenty-three hours; being equivalent to one day's

employment of $1^{52}/_{100}$ H.P. *per ton* of goods.

"If fitted to run at SIXTEEN MILES per hour, the vessel will require 1,377 H.P., the cargo will be reduced to 1,264 tons, and the time to two days fourteen hours; being equivalent to one day's employment of $2^{86}/_{100}$ H.P. *per ton* of goods.

"If fitted to run at EIGHTEEN MILES per hour, the vessel will require 1,961 H.P., the cargo will be reduced to 585 tons, and the time to two days eight hours; being equivalent to one day's employment of $7^{75}/_{100}$ H.P., *per ton* of goods.

"And if fitted to run at TWENTY MILES per hour, there will be no displacement available for mercantile cargo.

"Assuming, now, that the COST per ton of goods will be in proportion to the amount of power and tonnage employed to do the work, it appears that the cost *per ton of goods* of performing this passage of 1,000 miles, at the respective speeds of 8, 10, 12, 14, 16, and 18 miles, will be proportional to the numbers—$^{33}/_{100}$, $^{55}/_{100}$, $^{91}/_{100}$, $1^{52}/_{100}$, $2^{86}/_{100}$, and $7^{75}/_{100}$, which are proportional to the numbers 33, 55, 91, 152, 286, and 775, or nearly as 1, 2, 3, 5, 9, and 23.

"Hence it appears, that in the case of the ONE THOUSAND MILES passage above referred to, the cost of freight *per ton of goods* at TEN MILES per hour, will require to be nearly the *double* of the rate at EIGHT MILES per hour.

"The cost per ton at TWELVE MILES per hour will require to be *three times* the rate at EIGHT MILES.

"The cost per ton at FOURTEEN MILES per hour will require to be *five times* the rate at EIGHT MILES.

"The cost per ton at SIXTEEN MILES per hour will require to be *nine times* the rate at EIGHT MILES.

"The cost per ton at EIGHTEEN MILES per hour will require to be *twenty-three times* the rate at EIGHT MILES.

"And at TWENTY MILES per hour there will be *no displacement* available for mercantile cargo.

"By applying the same process of calculation to a ship of 5,000 tons' mean displacement, making a passage of THREE THOUSAND MILES, we shall find that, at TEN MILES an hour, the cost of freight per ton will require to be double the rate of freight at EIGHT MILES.

"The cost per ton at TWELVE MILES will require to be three times the rate at EIGHT MILES.

"The cost per ton at FOURTEEN MILES will require to be six times the rate at EIGHT MILES.

"The cost per ton at SIXTEEN MILES will require to be twenty times the rate at EIGHT MILES.

"And at EIGHTEEN MILES per hour there will be *no displacement* available for mercantile cargo.

"Finally, by applying the same process of calculation to a ship of 5,000 tons' mean displacement on a passage of 6,000 miles, it will be found that the cost of freight per ton at TEN MILES per hour will require to be *double* the rate at EIGHT MILES.

"The cost per ton at TWELVE MILES per hour will require to be about *five times* the rate at EIGHT MILES.

"The cost per ton at FOURTEEN MILES per hour will be about *sixteen times* the rate at EIGHT MILES.

"And at SIXTEEN MILES per hour there will be *no displacement* available for mercantile cargo.

"Hence, it appears, that for voyages of 1,000 miles and upwards, without re-coaling, the speed of ten nautical miles per hour would involve about *double* the cost *per ton* of eight miles, and may, therefore, be regarded as the extreme limit that can be generally entertained for the mercantile purpose of goods' conveyance; and that the attainment on long passages of a higher rate of speed than ten miles (though admissibly practicable) would involve obligations altogether of an exceptional character, such as the special service of dispatches, mails, passengers, specie, and the most valuable description of goods can only meet."

SECTION V.

OCEAN MAIL STEAMERS CAN NOT LIVE ON THEIR OWN RECEIPTS.

INCREASE OF BRITISH MAIL SERVICE: LAST NEW LINE AT $925,000 PER YEAR: THE SYSTEM NOT

BECOMING SELF-SUPPORTING: CONTRACT RENEWALS AT SAME OR HIGHER PRICES: PRICE OF FUEL AND WAGES INCREASED FASTER THAN ENGINE IMPROVEMENTS: LARGE SHIPS RUN PROPORTIONALLY CHEAPER THAN SMALL: AN EXAMPLE, WITH THE FIGURES: THE STEAMER "LEVIATHAN," 27,000 TONS: STEAMERS OF THIS CLASS WILL NOT PAY: SHE CAN NOT TRANSPORT FREIGHT TO AUSTRALIA: REASONS FOR THE SAME: MOTION HER NORMAL CONDITION: MUST NOT BE MADE A DOCK: DELIVERY OF FREIGHTS: MAMMOTH STEAMERS TO BRAZIL: LARGE CLIPPERS LIE IDLE: NOT EVEN THIS LARGE CLASS OF STEAMERS CAN LIVE ON THEIR OWN RECEIPTS: EFFICIENT MAIL STEAMERS CARRY BUT LITTLE EXCEPT PASSENGERS: SOME HEAVY EXTRA EXPENSES IN REGULAR MAIL LINES: PACIFIC MAIL COMPANY'S LARGE EXTRA FLEET, AND ITS EFFECTS: THE IMMENSE ACCOUNT OF ITEMS AND EXTRAS: A PARTIAL LIST: THE HAVRE AND COLLINS DOCKS: GREAT EXPENSE OF FEEDING PASSENGERS: VIEWS OF MURRAY AND ATHERTON ON THE COST OF RUNNING STEAMERS, AND THE NECESSITY OF THE PRESENT MAIL SERVICE.

From the foregoing SECTION it is evident that the cost of running ocean steamers is enormous, and that in the chief element of expenditure it increases as the cube of the velocity. This, although true, is certainly a startling ratio of increase, and calculated to arouse attention to the difficulties of postal marine navigation. Seeing that ocean speed is attainable at so high a cost, we naturally conclude that fast mail steamers can not live on their own receipts upon the ocean.

Since Great Britain established her first ocean steam

mail in 1833, she has gone on rapidly increasing the same facilities, until her noble lines of communication now extend to every land and compass every sea. The last great contract which she conceded was last year, to the "European and Australian Company," for carrying the mails on a second line from Southampton *via* Suez to Sydney, in Australia, at £185,000, or $925,000 per year. And although her expenditures for this service have gradually gone up to above five millions of dollars per annum, she continues the service as a necessity to her commerce, and a branch of facilities and accommodations with which the people of the Kingdom will not dispense. The British Government set out with the determination to have the advantages of the system, whether it would pay or not. They believed that the system would eventually become self-supporting, by reason of the many important improvements then proposed in the steam-engine, and they have ever since professed to believe the same thing. But their experience points quite the other way; and while the service is daily becoming more important to them in every sense, it is also becoming year by year more expensive.

Contracts which the Admiralty made with several large and prominent companies in 1838 they renewed at the same or increased subsidies, after twelve years' operations, in 1850, for another term of twelve years. And so far from those companies with their many ships on hand being able to undertake the service for less, they demanded more in almost every case, and received it from the government. The improvements which they anticipated in the marine engine were more than counterbalanced by the rise in the price of fuel and wages all over the kingdom

and the world. In fact, those improvements have been very few and very small. It still takes nearly as much coal to evaporate a pound of water as it then did; and the improvements which have been made were generally patents, and costly in the prime cost of construction to a degree almost preclusive of increased benefits to the general service. At any rate, the latest steam adaptations and improvements have proven unequal to the end proposed, and the cost of the ocean service is now far heavier than it ever has been before, simply because of the greater speed required by the public for the mails and passage.

It had long been hoped that this difficulty of increasing cost in running ocean steamers might finally be overcome by another means; and the whole available engineering and ship-building talent of Great Britain and the United States has been directed not entirely to the engine department, but to the hulls and to the production of a large class of ships, which are admissibly cheaper in proportion to size and expense of running when compared with smaller vessels, if they are always employed and have full freights and passage. It is well established that large steamers run proportionally cheaper than small ones. (*See Table III., page 76.*) This arises from the important fact that the length increases far more rapidly than the breadth and depth. Consequently the tonnage of the vessel increases much faster than the resistance. In passing through the water the vessel cuts out a canal as large as the largest part of its body, which is at the middle of the ship. If the vessel be here cut in two, the width and depth, or the beam and hold being multiplied together will give the square contents of the midship section. Now, when a vessel is doubled in all of its dimensions, this

midship section and consequently the size of the canal which it cuts in the water, does not increase as rapidly as the solid contents of the whole ship, and consequently, as the tonnage. Hence, the resistance to the vessel in passing through the water does not increase so rapidly as the tonnage which the vessel will carry.

To make this clearer, let us suppose a vessel of good proportion, whose length is seven times the beam, or 280 ft. long, 40 ft. wide, and 30 feet deep. The midship section will be 40 × 30 = 1,200 square feet: the solid contents will be 40 × 30 × 280 = 336,000 solid feet. Again, let us double these dimensions, and the ship will be 80 ft. wide, 60 ft. deep, and 560 feet long. The midship section will be 80 × 60 = 4,800 square feet: the solid contents will be 80 × 60 × 560 = 2,688,000 solid feet. Now, comparing the midship sections, and also the said contents in each case we have,

Midship Section,	4,800	= 4 to 1. Increase as the squares:
Midship Section,	1,200	
Solid Contents,	2,688,000	= 8 to 1. Increase as the cubes.
Solid Contents,	336,000	

Thus, the midship resistance has increased as four to one, or as the square, while the solid contents, representing the tonnage, have increased as eight to one, or as the cube. It is evident that the ship has but four times the mid-section resistance, while she has eight times the carrying capacity. Therefore the

engine power, and the coal and weight necessary to propel a ship of twice the lineal dimensions, or eight times the capacity, would have to be only four times that of the smaller vessel, speaking in general terms; and as a consequence, the price of freight, considering the vessels to run at equal speed, would be but half as much in the larger as in the smaller vessel.

The attempt has been made to seize the evident advantages thus offered by increasing the size of the hull, until our clippers now reach an enormous size, and our steamers are stopping but little short of 30,000 tons. The splendid steamer "Leviathan" was built on this idea, and must prove a splendid triumph in comparative cheapness if she can only get business so as to run full, and keep herself constantly employed in her legitimate business, running. But it is hardly possible that she should be always filled with either freight or passengers. Some of our large clipper ships have experienced this difficulty. The time necessary to load and unload is too great for short routes, although they are well calculated for long passages. If one of these large steamers fail to get plenty of business the losses become exceedingly severe. The prime cost is immense; the interest on the capital and the insurance are very large; and the current expenses are even beyond those necessary for the government of some cities. These hazards all taken together more than neutralize the benefits which arise from extra size and extra proportional cheapness; so that notwithstanding all of the hopes which some have entertained for the cheapening of transport in this way, they are probably doomed to disappointment in the end; and ocean steaming continues as expensive as ever, and is growing even

more expensive than it has ever been known since its first introduction. (*See Coal Tables, pp. 71 and 75.*)

It is clear that, notwithstanding all of the advantages to be gained from increased size, steamers can not support themselves upon the ocean. Let us examine further the case of such a ship as the "Leviathan." I can not see that there is any normal trade in which she can run successfully. She may transport 6,000 tons of measurement goods to Australia; but it will be at the expense of fourteen to sixteen thousand tons of coals if the passage is made in fair time. If not, sailing vessels will subserve all purposes except travel quite as well. And certainly there is no class of freight for Australia or any other portion of the world, which will pay such an enormous coal-bill, and so many other expenses, and the interest and insurance on three and a half to four millions of dollars, just to save a few days in so long a voyage. And if the steamer is to do a freighting as well as passenger business, then a long voyage is essential to her.

Running is the legitimate business of a steamer. Her costly engines are put in her for locomotion. Her large corps of engineers, firemen, and coal-passers, are employed for running her, and are of no use when she is lying still, although necessarily on full pay. Her condition is abnormal and unnatural every day that she is lying at the docks, and taking or discharging freight; and hence, every day that she is thus employed she is not performing her proper functions. A sailing ship can better afford to lie still for weeks and await a freight, or slowly receive or discharge cargo; as she must pay only the interest on her investment, her dockage, the captain, and watchmen, and perhaps her depreciation. The prime

investment is much less. She has no costly engines and boilers. So are her current expenses. She has none of the costly *employées* that I have named, and who can never leave a steamer for a day. But eternal motion, flush freights, flush business, good prices, and constant employment, are everywhere essential to the steamer.

Suppose the "Leviathan" steamer running between Liverpool and New-York. She would be occupied ten days at least in receiving her freight, ten days in running and making port or docks, and ten days in discharging. Then, she would be employed only one third of her time in the business for which she was constructed, running; while during two thirds of it she would be acting simply as a pier or dock, over which freight would be handled. Now, with her costly engines, and costly and necessarily idle *employées*, she can not afford to be a dock; neither can she afford to lie still so long. Nor can she on such conditions get the freight necessary to her support. The community on neither side of the water would wish fifteen thousand tons of any class of freights which she could transport dumped down upon the docks at one time. They wish it to arrive a little and a little every day, as it is wanted, just enough to supply the market; and will not lie out of the money which they pay for it, and have it nearly a month in market before they need it, just to have it come on the "Leviathan." It must come along in small lots, just as they need it, and it must be shipped the day that it is bought, and delivered as soon as the ship is in, without being the last lot of fifteen thousand tons, and without keeping the owners so long out of their money. Suppose that A. puts the first lot of freight in at London: he will be the last to receive, it in New-

York. A smaller steamer taking another lot two days after, will deliver it before the large ship gets half way over. Or, again, the small steamer may leave London with it when the large steamer has nearly arrived at New-York, and deliver the lot here to the owner in advance. Beside not wishing so large a lot at once, they do not wish it all in one place. The double advantage of a great number of small vessels is, that they bring cargo along as it is wanted, and at the same time distribute it at all of the hundreds of large and small ports, without first delivering it at some great mammoth terminus, and then reshipping and distributing it to its final destination.

A gentleman, who is a prominent statesman, recently seriously advised me not to think of establishing a line of mail steamers between the United States and Brazil, for the accommodation of the hundreds of sailing vessels engaged in that trade, but to get up a mammoth company and run five or six thirty thousand ton steamers, like the Leviathan, between Norfolk and Rio de Janeiro. He said that the increased size of the steamer would enable me to carry freight cheaper than sailing vessels. The reasoning was neither very clear nor convincing to me on behalf of the mysterious capacities which he attributed to large steamers. I suggested that, in the first place, there was no cargo passing either way between the United States and Brazil which could afford to pay steam transportation under any circumstances; that so large a cargo could never be obtained at once in Rio de Janeiro or elsewhere; that the merchants of this country did not wish it all landed at one place; that it would cost as much to remove it from Norfolk to the place of consumption, as it would from Rio de Janeiro to its final

destination; that they did not wish it delivered all at once, but in small lots at a time, and distributed where it was needed; and that, even if it were at all practicable, which no business man could for a moment believe, the people would not be willing to have a fruitful field of industry in shipping occupied by some great overgrown company, with a great coffee monopoly, which would surely follow. Too much has been expected of large ships. The clipper "Great Republic" is not freighted half of her time. The "Leviathan" can not pay in freighting unless she runs to Australia and the East-Indies, and runs slowly, on very little coal. She may do very well with a voluntary cargo, which will load and unload itself in a hurry, such as a cargo of emigrants, and not steaming at too a high a speed. But it would require a dozen steamers as tenders to bring these emigrants from Ireland, Bremen, Havre, Hamburgh, Amsterdam, and other European cities, to her central dépôt in England. She would, however, become a most useful if not indispensable transport vessel for the British Government.

If the large class of steamers can not live on their own receipts, much less can the small. An adequate speed for the mails leaves no available space for cargo. The ship may carry two or three hundred tons of freight; but it pays perhaps but little more than the handling and the extra coal necessary to transport its extra weight. As a general thing, it may be safely said that when a vessel is well adapted to the mails and passengers she is filled with her own power, that is, with heavy engines, large boilers, and a large quantity of fuel, as also with her provisions and baggage. We have already seen how the size and weight of engines and boilers must increase, as well

as the bulk and cost of the fuel, to gain a little speed. But it is not generally known how large a quantity of consumable stores and baggage go in a well-supported mail packet. The greater the postal efficiency of a steamer the less is it able to carry freight; and the time will doubtless soon come when the fast mail packets will take nothing except a few express packages. The Persia now takes scarcely any freight, and the Vanderbilt can not think of doing it when she makes fast trips. It is very probable that the whole system of the ocean will be materially changed; and that while clippers and slow propellers carry the fine freights, fast vessels filled with their own power will carry the mails and passengers. And in doing this, they can not, of course, support themselves; neither will they conflict with private enterprise in freight transport. It is now the case to a large extent on most of our American lines.

While the ocean mail steamer must be fast and costly, for the better acceleration of correspondence and the accommodation of passengers, she must also go at the appointed hour, whether she is repaired or not, and wholly irrespective of her freight and passenger list. There must be no delays for a lot of freight, or for a company of fifty passengers who have been delayed by the train. She has the mails, and must go at the hour appointed, whatever it may cost the company, and however large a lot of costly stores may have to be thrown away. This punctuality, while it is the means of securing small lots of freight, prevents also the accommodation of the ship's day of sailing to arrangements which might otherwise be profitable. This punctuality in sailing always necessitates large extra expense in repairs. It frequently happens that companies of men work

through the nights and on Sundays; getting much increased prices for such untimely labor, and being far less efficient in the night than in the day. If the steamer has had a long passage from whatever causes, she discharges whatever she has and takes in her coal in a hurried and costly way, frequently at fifty per cent. advance on the cost necessary for it if she had ample time. The only means of avoiding these exigencies is by having spare ships, which cost as much as any others, but which add nothing whatsoever to the company's income. It may be safe to say that in every mail company it is necessary to have one spare, and consequently unproductive, ship for every three engaged in active service. This thirty-three per cent. additional outlay would not be necessary except on a mail line, where punctuality was positively demanded. Yet, it is one of the heavy items of expense to be incurred by every company carrying the mails, and with which they can not in any wise dispense, however well their ships may be built. The "Pacific Mail Steamship Company" in running their semi-monthly line from Panama to California and Oregon, keep constantly at their docks eight unemployed steamers and one tow-boat, ready for all exigencies and accidents, and could keep their mails going if nearly their whole moving fleet should be sunk at once. No wonder that they have never missed a single trip, or lost a single passenger by marine accident since they first started in 1850. But there is another class of costs in running ocean steamers, which amount to large sums in the aggregate, and of which the people are generally wholly ignorant. I allude to the items, and what may be called "odds and ends." It is easily imaginable that a company has to pay only the bills for wages, for fuel, and for provisions, and that then the cash-

drawer may be locked for the voyage. Indeed, it is difficult for those accustomed to the marine steam service to sit down and enumerate by memory in one day the thousand little treasury leaks, the many wastages, the formidable bill of extras, and the items which are necessary to keep every thing in its place, and to pay every body for what he does. The oil-bill of a large steamer would be astonishing to a novice, until he saw the urns and oil-cans which cling to every journal, and jet a constant lubricating stream. The tools employed about a steamer are legion in number, and cost cash. We hear a couple of cannon fired two or three times as we enter and leave port, or pass a steamer upon the ocean, and consider it all very fine and inspiring; but we do not reflect that the guns cost money, and that pound after pound of powder is not given to the company by the Government or the public. The steamer carries many fine flags and signals, which cost cash. An anchor with the chain is lost; another costs cash. Heavy weather may be on, and it takes some hours to get into the dock. The extra coal and the tow-boat cost cash. The wheel-house is torn to pieces against the corner of the pier, and the bulwarks are carried away by heavy seas; but no one will repair the damage for any thing short of cash. A large number of lights are by law required to be kept burning on the wheel-houses and in the rigging all night; but no one reflects that it took money first to purchase them, and a constant outlay to keep them trimmed and burning. People suppose that the captain, or steward, or some body else can take a match and set the lamp off, and have it burn very nicely; but there are only a few who know that it takes one man all of his time to clean, fill, adjust, light, and keep these lamps going, as well as have them extinguished at the proper time.

I saw to-day a case in point as regards accidental expenses. The splendid steamship Adriatic sailed at 12. The wind was very high from the south, and almost blowing a gale. She was lying on the southern side of the dock, while the Atlantic was lying with her stern at the end of the dock, near where the Adriatic had to pass in going out. At the moment of starting, three strong tow-boats were attached to her bow, and endeavored as she went out to draw her head against the wind, down stream. But they proved insufficient to the task. The vessel crushed down the corner of the dock, ran into the Atlantic, and carried away her stern bulwarks, crushed one of her own large and costly iron life-boats, and damaged one of her wheel-houses. Now, who of the two hundred thousand spectators that lined the docks, would pay the two thousand dollars for the life-boat, a thousand for repairing the dock and vessels, and the bill for the three tug-boats for two hours each?

Moreover, we see a pilot get on the steamer at New-York, another at Southampton, and a third at Havre; but we seldom reflect that the steamer has to pay a large price to each one of them, both going and coming. Take the coasting steamers, running between New-York and Savannah, or Charleston. It appears singular that the New-York pilot goes all the way to Savannah, that the Savannah pilot comes all the way to New-York, and that the steamer pays for both of these men all the time, and feeds them on board all of the time. Yet it is so. Such is the law; and it amounts to a good many thousands during the year. And all this, the company must pay, as a part of those items which take cash, but for which the company never gets any credit from the public or the Government. Whenever a little accident occurs to the

steamer, it must be towed a few miles at a high price by a tug-boat. Whenever the Government or friends and visitors come on board, they expect to be liberally entertained; yet the company must pay for it, or be considered mean and unworthy of the Government's patronage. Each ship must have an experienced surgeon, whose wages must be paid like those of other persons employed, and an apothecary's room and outfit. The ship must be painted and varnished, and overhauled at every trip; the upholstering and furnishing must be often renewed; stolen articles must be replaced; and the breakages of table-wares constantly renewed. All of this costs cash.

The steamer also has to pay light dues and port charges wherever she goes. Many of these are exorbitant and unreasonable. In Havre the "Fulton" and "Arago" must pay nearly twenty-four hundred dollars each on every departure, or they will not be permitted to leave the docks. This is no small item for each steamer on every passage that she makes. At New-York she pays wharfage again. It is not so high, but it is a large item, and requires the cash. Again, there is the great shore establishment which every steam company must maintain. Large docks, and warehouses, and coaling arrangements, staging, watchmen, porters, and messengers, and a shore-captain equal to those on board, must all be maintained. The Havre Company pays to the city $4,000 per year for its dock, $1,200 for its annual repairs, and also for sheds, fixtures, etc., extra. They keep also two watchmen at $40 each per month, and other persons in the dock service. The Collins Company have a necessarily very costly dock both in New-York and Liverpool. That in New-York would

rent for $15,000 per annum. The one in Liverpool is far more costly. On each they keep a large number of men, with watchmen, gatekeepers, runners, porters, and clerks, and always keep an office open. Beside this, is the whole paraphernalia of the office of the company. There must be offices, clerks, bookkeepers, porters, runners, etc.; a president, treasurer, and secretary; an attorney, agents, and agencies; and newspaper advertising, and a hundred little things which no man can mention. I do not pretend to be able to give an adequate conception of the innumerable items which so swell the large actual working expenses of regularly running steamers. Even the charities of a decently managed company are large. Firemen and engineers become disabled and must be supported; or they are killed in the service of the ship, leaving families which no decent company can disregard. The amount which the West-India Royal Mail Company pays in this way, and which our noble American lines advance to the deserving, are beyond all conception of the mere theorist.

There is another source of loss which prevents, mail packets especially, from paying their expenses on their freight and passenger earnings. The table on all of our steamships has become exceedingly expensive, as it has in our hotels. Perhaps there is more necessity for it on steamers than in the hotels, as passengers are generally sea-sick, and need every delicacy of life to keep them up. The supplies which our fine mail packets carry for this purpose are of almost incredible extent and costliness. No vegetable, fruit, game, or other rarity that can be kept fifteen days in large masses of ice, is neglected; so that the table of every steamer is necessarily both luxurious

and expensive. Indeed, it has become so much so, and the price of passage fare has been reduced so low on all of the prominent lines, that as a general rule the steamers are not now making much clear money on their passengers. The expense of keeping passengers was not half so great six years ago, as it is now; and there appears to be no safe means of permanent retrenchment. Nothing has been said of Insurance. This is a most costly item. The Havre Company pay on their two ships, which are worth about $900,000, nine and a half per cent. per annum; and Mr. Collins pays on his three ships, which are worth about $2,200,000, nine per cent. per annum. On the Havre steamers this amounts to $85,500 per year, which is nearly as much as the mail pay; and on the Collins, to $198,000 per annum. And these are among what we call the items of mail steamship expenditure. I do not know the sums paid by the United States Mail, or by the Pacific Mail Companies.

I will here give the views of Messrs. Murray and Atherton on the cost of steam, as they replied to letters of inquiry, which I addressed them Sept. 14, 1857. Mr. Murray says in answer to

Query 2. "It is certainly my impression that ocean steamers of sufficient speed to carry the mails with any thing like regularity, will not pay upon any route with which I am acquainted, without assistance from Government."

Query 5: Can Parliament do better in economy than in her present mail contracts, all things considered? Mr. Murray replies:

"I do not see how Parliament can avoid paying the

large subsidies she does for the mail contracts under present circumstances."

Query 4: Is the steamship stock of Great Britain, subsidized or unsubsidized, paying stock, and is there much disposition among capitalists to invest, even in the stock of subsidized companies? He replies:

"I do not think the steamship stock of Great Britain to be in a very nourishing condition: in fact, I know of only one company (the Peninsular and Oriental) in which I should like to invest money."

Mr. Atherton replies to a query regarding the cost of running steamers as follows:

"As to whether the effective performance of high speed mail service is compatible with ordinary mercantile service without government subsidy, I am of opinion that the mutual relation of Speed and Cost in connection with long sea-voyages has never yet been duly appreciated by owners, managers, or agents in charge of steam shipping affairs. An acceleration of steaming speed involves an increase of cost expenses, and a decrease of mercantile earnings, as dependent on *freight per ton weight* far beyond what is generally supposed."

He further says in reply to Query 9, which is as follows:

Do you know of any disposition in the Government to cut down the ocean mail service, as an unproductive expenditure? He says:

"It is impossible to estimate the national value of an

effective mail service throughout the whole globe; the breaking of one link, though apparently of trivial consequence, impairs the whole system. I can not imagine that there is any disposition to impair the completeness of the mail system."

From the foregoing considerations it is palpable that fast ocean steamers can not live on their own receipts. And the same will in most cases hold true of freighting and other steamers of all classes, which depend entirely on steam as their agent of locomotion. Propellers will hardly form an exception to this rule. If the power and the passengers fill the hull, if the coal bill and other expenses increase as rapidly as indicated for mail packets, if engineering improvements do not advance as rapidly as the price of coals, if larger and more cheaply running ships can not get an adequate support in business, if there are the many leakages and expenses indicated, and if all of the expenses of running steamers are continually increasing from year to year rather than diminishing, then we may never expect to see the mail and passenger steamers of the ocean become self-supporting, or less dependent than now, on the fostering care of the Government and the national treasury.[C]

[C] Since this was written, Mr. Drayton has shown me the receipt for this year's *taxes* on the Havre Company, which are $7,782, the two ships being valued at $500,000 only.

SECTION VI.

HOW CAN MAIL SPEED BE ATTAINED?

THE TRANSMARINE COMPARED WITH THE INLAND POST: OUR PAST SPASMODIC EFFORTS: NEED SOME SYSTEM: FRANCE AROUSED TO STEAM: THE SAILING-SHIP MAIL: THE NAVAL STEAM MAIL: THE PRIVATE ENTERPRISE MAIL: ALL INADEQUATE AND ABANDONED: GREAT BRITAIN'S EXPERIENCE IN ALL THESE METHODS: NAVAL VESSELS CAN NOT BE ADAPTED TO THE MAIL SERVICE: WILL PROPELLERS MEET THE WANTS OF MAIL TRANSPORT, WITH OR WITHOUT SUBSIDY: POPULAR ERRORS REGARDING THE PROPELLER: ITS ADVANTAGES AND DISADVANTAGES: BOURNE'S OPINION: ROBERT MURRAY: PROPELLERS TOO OFTEN ON THE DOCKS: THEY ARE VERY DISAGREEABLE PASSENGER VESSELS: IF PROPELLERS RUN MORE CHEAPLY IT IS BECAUSE THEY ARE SLOWER: COMPARED WITH SAIL: UNPROFITABLE STOCK: CROSKEY'S LINE: PROPELLERS LIVE ON CHANCES AND CHARTERS: IRON AS A MATERIAL: SENDING THE MAILS BY SLOW PROPELLERS WOULD BE AN UNFAIR DISCRIMINATION AGAINST SAILING VESSELS: INDIVIDUAL ENTERPRISE CAN NOT SUPPLY MAIL FACILITIES: THEREFORE IT IS THE DUTY OF THE GOVERNMENT.

I have endeavored to prove in the foregoing SECTION that ocean mail steamers can not live on their own receipts. The question now arises, how can we secure speed for the mails and passengers upon the ocean? With so many expenses and so small an income the fast ocean steamer can not become profitable to even

the most thoroughly organized and best administered companies. Much less can it be successfully run by individuals and individual enterprise, which has never so many reliable resources at command as a strong, chartered company. It is true that there are a few prominent transatlantic routes where steamers can run as auxiliary propellers; but the number of them is small, and the speed attained will by no means prove sufficient for postal purposes. The transmarine postal service has been a source of constant annoyance to almost every commercial nation. The overland mails have generally been self-supporting, and it has been a favorite idea that those on the sea should be so also; although there is no just reason why either should be necessarily so any more than in the cases of the Navy and the Army; branches of the service which entail large expenses on the Government, and yet without a moiety of the benefits which directly flow from the postal service to all classes of community. No nation except Great Britain has come up to the issue and faced this question boldly. Almost every other country, not excepting our own, has been hanging back on the subject of the transmarine post, "waiting, like Mr. Micawber, for something to turn up," in the improvements of ocean steam navigation, which might obviate the necessity of paying for the ocean transit. But every hope has been disappointed; and instead of realizing these wishes the case has been growing worse year by year, until we are at last compelled to move in the matter, or lose our commerce, our ocean *prestige*, and sink down contented with a second or third-rate position among commercial nations, and acknowledge ourselves tributary to the far-seeing and far-reaching, and superior policy of our competitors.

The United States have indeed become galvanically aroused now and then, as in 1847 and '8, to a self-protecting and a self-developing system; but as soon as one faint effort has been made, we have, instead of pursuing that effort and developing it fully, relapsed back into our old indifference, and given the whole available talent of the Government either to the administration, or to the everlasting discussion of petty politics. During the time that President Buchanan was Secretary of State, some of our noblest efforts for the establishment of ocean mails were made, with his fullest countenance and aid; but the policy then inaugurated with prospects so hopeful for our commercial future, and which has operated so healthfully ever since, is now half abandoned, or left without notice to take care of itself; until it may be to-day said that we have no steam policy, and run our ocean mails only by expedients. This ever has been and ever will be unfortunate for us, and costly. Individuals and companies build steamers for the accidents of trade, let them lie still a year or two, then pounce upon some disorganized trade, suck the life-blood from it like vampires, and at last leave it, the very corpse of commerce, lying at the public door. All such irregular traffic is injurious to the best interests of the country, destroys all generous and manly competition, and proves most clearly the want of a Government steam mail system. France has been awaiting the issues of time, and under a too high expectation for the improvements of the age, until she finds that unless she inaugurates and sustains a liberal steam policy, and becomes less dependent on foreigners for her mails, she will have the commerce of the world swept from her shores as by a whirlwind of enterprise. She has now become aroused, and has determined to establish three great

lines of communication, one with the United States, one with the West-Indies, Central America, the Spanish Main, and Mexico, and one with Brazil and La Plata. She has found, that it will no longer do to abandon her mails to fate, and that in the end it will be far more profitable to pay even largely for good mails than to do without them. Hence, her offer to give to the American, West-Indian, and Brazilian service named an annual subvention of fourteen million *Francs*, or nearly three million dollars, to be continued for twenty years, which the Government deems a sufficient period for the establishment and test of a system. (*See* projêt *of Franco-American Navigation, page 198.*)

Among the many expedients adopted for the transmission of the foreign post are those of employing ordinary sailing vessels on the one hand, or the vessels of the war marine on the other. Both systems have been effectually and forever exploded and abandoned. The objections to sailing vessels are very numerous. They are, in the first place, too slow. They are too uncertain in their days of sailing and arrival. They can never be placed under the direction of the Department because they are private property, devoted to private uses, and generally accomplish their ends by private means; one of the most prominent of which is, to keep back all letters except those going to their own consignees. If a merchant runs his ship for personal gain it is not to be supposed that he will carry the letters of his commercial competitors, and thus forestall his own speculations. Sailing vessels have no proper accommodations for the mails, and can not fairly be forced either to transport or to deliver them. The uncertainties of cargo are such that they can not sail

on fixed days with punctuality. But the great difficulty is their want of speed and the uncertainty of their progress or arrival. Whenever they have been employed by the British Government for postal service they have always proven themselves inefficient and unreliable. Whenever they have been superceded by steamers, the postal income, before small, has gone up rapidly to five, ten, or twenty times the former income. This was well illustrated in the British and Brazilian lines. The Parliamentary returns for 1842, when postal service with Brazil and La Plata was performed by a line of fine sailing packets, give the total income from postages at £5,034, 13*d*, 6*s* Lord Canning, the British Post Master General, stated that, in 1852, two years after the Royal Mail Steam Packets commenced running to Brazil and La Plata, the income from postages was £44,091, 17*s*, or nearly nine times as much as when the mails went by sailing vessels.[D] Ship owners have a strong aversion to receiving letters for the places to which their ships are bound. As a barque was about sailing from New-York for Demerara in 1855, I called on the owner, who was on the dock, just before the vessel got under way, and asked that some letters which I held in my hand, might be taken to Georgetown. He said that he could not take them; that he sailed his vessel to make money; and that he could not do other people's business. As I walked away from him rather abruptly, he called to me and wished to know to whom the letters were addressed. I told him, to Sir Edmund Wodehouse, the Governor of the Province; and that they related to the establishment of steam mail facilities between this country and that Province. He at once begged my pardon and explained; asked that I would let him send the letters; and said, moreover, that he would at

any time be glad to give me a passage there and back on that business.

> [D] See Parliamentary Papers for 1852-3, postal affairs, Report of Lord Canning, July 8, 1853.

The experiment of employing the steamers of the Navy in the postal service has been very fully made by Great Britain. After attempts on a considerable number of lines, and extending over a period of ten years, this service has been found inefficient, cumbrous, and more costly, and has been entirely abandoned. Murray, page 172, says that Mr. Anderson, Managing Director of the Peninsular and Oriental Company, said before the Parliamentary Committee as follows: "The postal communication can be done much cheaper by private contract steamers than by Government boats, because of the merchandise and passengers carried. The steam communication between Southampton and Alexandria, with vessels of 300 to 400 horse power, was done for 4*s* 6*d*, per mile. From Suez to Ceylon, Calcutta, and Hong Kong, with vessels of 400 to 500 horse power, for 17*s*, 1*d* per mile. The East-India Company's line (of naval vessels) between Suez and Bombay with vessels of only 250 to 300 horse power, cost 30*s* per mile. Her Majesty's vessels in the Mediterranean cost about 21*s* per mile." France also tried the experiment, but soon abandoned the system, as fruitless and exceedingly annoying. It is quite a plausible idea that our mails should go under the flag of the country, with power to protect them, and that vessels generally supposed to be idle should be engaged in some useful service. But this presupposes a fact which does not exist. No vessels in the world are more actively employed than those of

the American navy, and there are many stations on which we could employ twice as many as we have with excellent effect on our commerce and foreign relations generally. We constantly hear the complaint that the Secretary of the Navy has no steamer for some immediately necessary or indispensable service. But if he had, and if two dozen steamers were lying all the time idle in our navy yards, they would probably not be installed six months in the postal service until they would be positively demanded in some way in that of the nation, and this diversion would at once frustrate all of the postal and commercial plans of the country.

But the difficulties in the way of this service are so numerous as to be readily palpable to all who examine it. No vessel that is well fitted for naval service is well adapted to that of the post. The post requires great speed, and hence, full-powered vessels. The navy does not require so great speed, and hence, the steamers are seldom more than auxiliaries. They are built heavier and fuller, and are not so adapted to speed. Filling them with the power necessary to drive them with sufficient rapidity for mail packets would unfit them for the efficient service of war. Naval vessels are, moreover, filled and weighted down with guns, stores, men, and a thousand things which would be in the way if they were employed for the mails. They have no state-rooms, cabins, saloons, etc.; and if they had them so as to accommodate passengers, they would be unfit for the war service. Unless so fitted they could not accommodate passengers, as they will not lash themselves up in hammocks under the deck, as thick as grass, as man-of-war's men will. If they are to be strictly naval vessels while running, they will be

filled with their own men, and could not take passengers even if they had state-room accommodations for them. They would thus be deprived entirely of this source of income. Again, they could take no freight; and if a passenger mail steamer has to depend upon both freight and passengers for an income to meet the large expenses, which are generally three, five, and often even ten times the sum of subsidy received from the Government, then the naval vessel running in the postal service will be deprived of both these sources of income, and must fall back on the department for all of its expenses, which would be three, five, and even ten times as much as the sum paid private companies for carrying the mail.

The average round trips of the Pacific mail steamers from Panamá to San Francisco and Olympia, and back, are, beyond doubt, enormously expensive; while they receive from the Government only $14,500. This is, consequently, but a small fractional part of their income. The trip of the "Arago," or "Fulton," to Havre and back, costs about $45,000, while the mail pay was only $12,500, under the old contract, and is now probably not above $7,500 per round trip.[E] These estimates are made exclusive of insurance, which is $9^1/_2$ per cent.; repairs, 10 per cent.; and depreciation, at least five per cent. Here, again, the Government gives but a meagre part of the large sum necessary to keep those packets running. Now, if naval vessels were carrying the same mails, and were deprived of the income which they receive for freight and passengers, it would evidently cost the Government six to eight times as much to carry the mails as it now does, saying nothing about the income from the mails, which is trifling. But this

class of vessels never could subserve the purposes of rapid correspondence. If they could carry freight and passengers, the difficulties would still be insuperable. It would cost twice as much for the department to accomplish the same object through its officers and its routine as it would for private companies or individuals, who have but the one business and the one purpose in running their vessels. No man, company, or even department of the Government, can accomplish two important and difficult ends by the same agency at the same time. Either the one or the other must suffer and be neglected, or both will be but imperfectly and ineffectively performed. Many structures of this kind fall of their own superincumbent weight and clumsiness. If naval vessels thus running even had passengers they would never be satisfied or well treated. A captain and crew, to be agreeable and satisfactory to passengers, must feel themselves under obligation to them for their patronage, and would be compelled to exert themselves to merit the best feelings of their patrons. This could never be the case with naval gentlemen, who would be dependent for their living on the department only. It is probable that no one seriously entertains such a plan as this for the postal service, as this must be a distinct, partly self-supporting, unbroken, and continuous service, while that of the Navy must also be distinct, independent, and efficiently directed to one great cardinal object. Therefore, we can not secure postal service by this means.

[E] This line receives the total postages, ocean and inland, which in 1856 were, according to the Post Master General's report, $88,483.99, or $7,373.33 per round voyage. (*See Letter of the Hon. Horatio King, 1st Asst. Post Master*

General.)

As much has been said of Propellers during the few years past, I propose examining the question with the view of ascertaining whether they are adapted to the mail service, and whether we can secure from them sufficient speed without a subsidy from the Government. It is well known that the British are a far more steady-going people than ourselves, and not being so rushing do not require so much speed. They have had an easy control of the European and foreign commerce generally around them; and when competition aroused them to additional efforts they did not endeavor to outstride themselves, but took merely an additional step of progress and speed, and adopted the propeller for their coasting business, because it was a little faster than wind, and yet cheaper than full steam. And because so many propellers have been built for the peculiar short-route trade of Great Britain, many people in this country can not see why we do not adopt the propeller for our foreign trade. I have already shown (*See page 44*) that there are some short routes on which steam is cheaper than the wind, and that on others of greater length steamers can not transport freight under any conditions. (*See latter part of Section IV., on the Cost of Steam.*) I do not propose making the Screw Propeller in any way an exception to the position stated; and shall consequently maintain that it will never be the means of attaining a rapid and yet cheap mail speed.

There are no greater errors entertained by the public on any subject connected with steam navigation than concerning the Screw Propeller. It is generally supposed that it is a more economical and effective application of power than the side-wheel, which is a

mistake: it is generally supposed that, with the same amount of power and all other conditions equal, the propeller will not run as rapidly as the side-wheel, which is true of steaming in a sea-way or against a head-wind, but a mistake as regards smooth water: it is generally supposed that the engines weigh less, take up less room, and cost less, which is all a mistake. The best authors on this subject and the most eminent builders generally agree, that in England and Scotland, where the propeller has attained its greatest perfection, the difference between the side-wheel and the propeller as an application of power is very slight and hardly appreciable; or that the same number of tons of coal will drive two ships of the same size at the same speed in smooth water; but that the side-wheel has greatly the advantage in a head-sea or during rough weather generally. Many persons who do not understand the subject, have theorized in just the contrary direction. They say that in rough weather the screw has the advantage, because it is alway in the water, etc. Experience shows just the reverse; and theory will bear the practice out. If, in the side-wheel one wheel is part of the time out, the other has, at any rate, the whole force of the engines, and the floats sink to and take hold on a denser, heavier, and less easily yielding stratum of water; so that the progress is nearly the same. The back current or opposing wave can not materially affect it, because the float is at the extreme end of the arm where the travel is greatest, and is always more rapid than the wave. It is not so with the screw. The blade which meets the wave is not placed at the end of a long arm where the travel is very rapid and the motion more sudden than that of the wave. This blade extends all the way along from its extreme end, where the

motion is rapid, to the centre, or the shaft, where there is no motion; and all intermediate parts of this blade move so slowly, that the wave of greater rapidity counteracts it, and checks its progress. The side-wheel applies its power at the extreme periphery, where the travel is greatest, while the screw applies it all along between the point of extreme rapidity, and the stationary point in the shaft. There is, moreover, much power lost as the oblique blades of the screw rise and fall in a vertical line while the vessel is heaving.

In the new edition (1855) of "Bourne on the Propeller," he says in the preface:

"Large vessels, we know, are both physically and commercially more advantageous than small vessels, provided only they can be filled with cargo; but in some cases in which small paddle vessels have been superseded by large screw vessels, the superior result due to an increased size of hull has been imputed to a superior efficiency of the propeller. No fact, however, is more conclusively established than this, that the efficiency of paddles and of the screw as propelling instruments is very nearly the same; and in cases in which geared engines are employed to drive a screw vessel, the machinery will take up about the same amount of room as if paddles had been used, and the result will be much the same as if paddles had been adopted. When direct acting engines, however, are employed, the machinery will occupy a much less space in screw vessels than is possible in paddle vessels, and the use of direct acting engines in screw propellers is necessary, therefore, for the realization of the full measure of advantage, which screw propulsion is able to afford."

Atherton says of the propeller in his "Marine Engine Construction and Classification," page 45:

"Its operation has been critically compared with that of the paddle-wheel, under various conditions of engine power, and experience has shown that, under circumstances which admit of the screw propeller being favorably applied, it is equal to the paddle-wheel as an effective means of applying engine power to the propulsion of the vessel." Again:

I recently addressed to Mr. Atherton the following question: "Taking two ships of the same *size, displacement, and power, or coal*, the one a side-wheel, the other screw: What will be their relative *speed and carrying capacity* in smooth water? What in a sea-way, or in regular transatlantic navigation?" He replied under address, "Woolwich Royal Dock Yard, 14 Sept., 1857:

"It is my opinion, based on experiment, that a well-applied screw is quite equal to the paddle-wheel for giving out the power by which it is itself driven, that is, in smooth water. I can not say from observation or experience what is the comparative operation at sea."

I addressed the same inquiry to Mr. Robert Murray, of Southampton, who has written an able work, entitled, "The Marine Engine," and who is considered excellent authority, and have from him the following reply, dated Southampton, 19 Sept., 1857:

"With regard to the relative efficiency of the paddle-wheel and screw for full-powered mail steamers, I am disposed to prefer the paddle-wheel for *transatlantic* steaming, in which the vessel has to

contend with so much rough weather and heavy sea, and the screw for the Mediterranean and the Pacific routes.

"For auxiliary steamers of any kind the screw has manifestly the advantage.

"With regard to the actual speed obtained from each mode of propulsion in vessels of the same power and form, and with the propeller in its best trim, I am disposed to prefer the paddle-wheel, either in smooth water, or when steaming head to wind, but in other conditions the screw." What he means by "other conditions," is evidently when the screw is running with a fair wind, which is seldom, so as to use her sails. Bourne also states very clearly in two places that the propeller is by no means so efficient in a sea-way, as a side-wheel steamer, and admits that when a vessel is steaming at eleven or twelve knots per hour, the sails not only do not aid her, but frequently materially retard her motion. (*See Bourne, page 237.*)

All of these authorities agree that the application of a given power produces about the same effect, whether through the side-wheel or the screw; and if so, it is evident that the screw can not attain the same speed as the side-wheel, without burning as much fuel, and having as costly and as heavy engines and boilers. Indeed, taking the whole evidence together, it appears well settled by these authorities, that the screw is equal to the side-wheel only in smooth water, and that, as a consequence of this distinction, it is not equal to it in general ocean navigation. It has been seen that much of its power is lost when it contends with head-winds and seas, and that when it has attained a fair average mail speed, the wind will help it very little, if any, under the most favorable

circumstances. It is, therefore, reasonable to infer that it would cost more to attain a high average mail speed with the propeller than with the side-wheel. If in attaining this average mail speed the advantages are clearly in favor of the side-wheel, there is no hope that we shall accomplish the mail service at cheaper rates than heretofore, as this agency can not be introduced toward that end; for not only is the prime cost of the steamer the same, as also the consumption of fuel per mile, but there are other and numerous disadvantages connected with the propeller, which are wholly unknown to the side-wheel.

It is a well-known fact that propellers are compelled to be placed upon the docks three or four times as often as side-wheels. The screw either breaks, and must be replaced by another, or it cuts the boxes out, or works the stern of the vessel to pieces. Any one of these requires that the steamer shall be docked, however great the expense; and as these accidents are constantly occurring in even the best constructed and best regulated propellers, it follows that they must be constantly on the docks. This species of vessel being built necessarily narrower than the side-wheel, it rolls more, and is found to be an exceedingly disagreeable passenger vessel. Propellers have become deservedly unpopular the world over; and if it were possible for them to be faster than the side-wheel, it is hardly probable that first-class passengers would even then go by them, as they are known to be so exceedingly uncomfortable.

The propeller, I have before said, is erroneously supposed to run more cheaply than the side-wheel. I think that I have shown that as a mail packet it will cost more to run it at a given speed. But there are

certain cases in which it does run more cheaply; these are, however, only where the speed is low, and the machinery not geared, and where, as a consequence, sail can be used to more advantage than on a side-wheel. The economy is not the result of the application of the power by the screw, as compared with the side-wheel, but of the sail alone; and this economy is more or less, just as canvas is employed more or less in the propulsion. The screw is the better form of steamer for using sail; and the low speed at which propellers generally run, is a means of making that sail more effective. We have already seen, in the section on the cost of steam, that it generally requires twice the original quantity of fuel to increase the speed from eight to ten knots per hour in either style of steamer. Now, it is a well-known fact that the transatlantic propeller lines are on the average more than two knots per hour short of the speed of the side-wheels, which makes their passages across the Atlantic from two to six days longer than by the mail packets. They thus save from one half to two thirds of the fuel, and deducting its prime cost from the bill of expenses, they add to that of receipts the freight on the cargo, which occupies the space of the coal saved. They consequently run on much smaller expenses; but only when their speed is less than that of the side-wheels, and far too low for effective postal service. Economy thus purchased at the expense of speed may do for freight, and enable propellers to derive some profits from certain cargoes; but it can never subserve the purposes of mails and passengers. It must alway be recollected that the effective speed of the propeller is reduced just in the ratio of the greater economy as compared with the side-wheel.

It thus appears that with any appreciable economy the propeller must be slower than the side-wheel; and that with any considerable economy it can be but little faster than sail. It has, however, the advantage over sail of being rather more reliable and punctual, and can make arrivals and departures rather more matters of certainty. This at the same time secures to it a better class of freights as well as vast numbers of emigrants which together, enable it to incur the extra expense over a sailing vessel. The cargo is less in the propeller than in the sail, as much of the room is occupied by the engines, boilers, and fuel. Hence, the prices must be proportionally higher to meet the deficit arising from the smaller quantity. But there are very few trades in which propellers can run as noticed on so long a voyage as 3,000 to 4,000 miles; and these lie between a few countries in Europe and the ports of the United States. Their support arises chiefly from the emigrant trade; as without this their freights would not on any known lines enable them to run one month. And this is not simply an assumption of theory, but the experience of all the European lines. I was recently told in England and France by many persons who had no interest or desire to deceive me, that propeller stock was invariably a burthen to every body having any thing to do with it, and could generally be bought at sixty to seventy cents on the dollar, while much of it would not bring half of its cost price. They cited as an evidence the fact that no line of propellers is permanent, unless in some way connected with a subsidized company, as in the case of the Cunard screws running between Liverpool and New-York. The Glasgow line is also an exception, and is said to pay dividends. The screw lines are always hunting a home and a new trade. (*See views of Mr. Murray, page*

111.)

The only way in which some lines can run is by getting their stock at half its value and thus having to pay the interest on a smaller sum. The "General Screw Steam shipping Company" is an example. The Company had from the first lost money, although they had nine fine steamers, and were compelled finally to close up and sell out. Mr. Croskey, the United States Consul at Southampton, supposed that they might be put into a new trade and make a living on a smaller capital stock; that is, if the new company should get them at half their value. The transfer was made and the "European and American Steamship Company" was established. Some of the vessels were put into the trade between Bremen and London, Southampton, and New-York; some between Antwerp and Brazil; and some between Hamburg and Brazil. None of these lines have paid, except, perhaps, the New-York, which has had large cargoes of emigrants; and Mr. Croskey freely acknowledges that the new Company would have been ruined but for the Indian Revolt, which enabled him to charter five of the vessels to the Government at good prices, for the conveyance of troops by way of the Cape of Good Hope to India. Had the lines on which they were running been profitable they would never have been chartered to the Government. But like the whole propeller service of the world, this Company took the chances; and it may be safely asserted that but for the opportunities which vessels of this class find for chartering to the Government they could not live on their own enterprise three years. The number of these vessels is now very unnecessarily large; and many of them have been built to supply labor to the establishments, and for taking the chances of

Government employment at high prices. Their largest employment results from casualties rather than from the pursuit of legitimate trade. But the business is overdone, even for the English market, when foreign war is rather the rule, and peace the exception. But few propellers are now building; these few being small and intended for the coasting, or the short-line Continental trade, where they will readily pay. (*See page 42 for propeller stock; also pages 44 and 45 for the propeller coasting service.*)

It does not materially alter the complexion of this question to say that propellers are generally constructed of iron. There is not such a difference in their prime cost or their stowage capacity as to enable them to take the large receipts necessary to their support; while certainly there is no advantage to be gained in speed from iron as a material of construction. The iron propeller can be constructed cheaper than the wooden in Great Britain, because of the great scarcity of timber and the large and redundant quantity of iron; and an iron vessel has some advantage in being able to stow a larger cargo, from the fact that her sides and bottom are not so thick as those of wooden vessels; but these considerations do not very materially affect the consumption of fuel, and the quantity necessary to carry a ton of freight. Iron is probably a better material than wood for the construction of propellers, as the part about the stern, where the screw works, can be made stronger, and as all iron vessels can be rather more readily divided into water-tight compartments by bulkheads. Yet as a material of construction it offers no transcendent advantages over the side-wheel for transatlantic navigation, while it is not probably so safe, or so

comfortable for passengers. Yet, it will be well for us to adopt the propeller largely in our coasting trade, and iron as the material of its construction.

We have thus seen that to save fuel and carry freight, the speed of the propeller must be low; indeed very low, if it is to live on its own receipts. It is therefore clearly impossible that with such comparatively low speed it should carry the mail. Neither can it support itself except by this low speed. By running thus but a fraction faster than the sailing vessel, it can command on a few prominent lines a large freight; but to give vessels of such speed a subsidy for carrying the mails would be both to render the mail service inefficient, and to enable the propeller to compete with the sailing lines of the country at very undue advantage, which would be an unfair discrimination against all sailing interests. Should the propeller, like the side-wheel, run fast enough on the average trips of the year to carry the mails, which would certainly be at the expense and abandonment of any considerable freighting business, then the Government might with propriety pay for the mails, as these steamers would not injure the freighting business of sailing vessels. The outcry by sail owners against steamers as competitors can not be against the mail packets; for these carry but little freight; but against these slow screws which should be treated like all other freighting vessels, notwithstanding the fact that some of their owners have had the impudence to propose them for the paid mail service and to ask a subsidy from the Government, but the better to cripple the interests of sailing vessels. As well might Government subsidize fast clippers, because they are a little faster than regular, ordinary sailers. When the steamer runs with

sufficient rapidity for the mails, the sailing ship has nothing to fear from competition, and has all the benefits of the more rapid correspondence. Thus, Government must pay only where there is a fast mail, whether it be in a side-wheel or propeller; otherwise it destroys individual competition and cripples private enterprise.

If, as we have seen from all the facts regarding the expense of running steamers, individual enterprise can not supply adequately rapid ocean postal facilities, and if such facilities are yet wholly indispensable to the commerce, the people, and the Government, the only alternative presented is for the Government to pay for them, and to require, as it has of all the American lines, such a speed as to prevent injurious competition to sailing vessels and private enterprise. Much capital is made by certain ship owners out of what they call the undue discrimination of subsidies against their vessels; but they can never lay this charge at the door of the fast and very expensive mail packets, or elsewhere than upon the slow auxiliary propellers which any of them have a right to attempt to run, and which the Government never did and never will subsidize. This is the source and the only source of all the vaunted injurious effects of steam on the sailing stock of the country. It is a question with which the Government has nothing to do, and which must be settled between propeller owners and sail owners themselves, and with reference, perhaps, to the wishes of their customers. Mail steamers have enough to do to get money to pay their coal, provision, repair, and innumerable extras bills, without wrangling over the freighting business. And, from all this we conclude that the only means of the

Government securing an adequate mail speed is by paying for it. (*See remarks of Committee on this subject, Paper E.*)

SECTION VII.

WHAT IS THE DUTY OF THE GOVERNMENT TO THE PEOPLE?

RESUMÉ OF THE PREVIOUS SECTIONS AND ARGUMENTS: IT IS THE DUTY OF THE GOVERNMENT TO FURNISH RAPID STEAM MAILS: OUR PEOPLE APPRECIATE THE IMPORTANCE OF COMMERCE, AND OF LIBERAL POSTAL FACILITIES: THE GOVERNMENT IS ESTABLISHED FOR THE BENEFIT OF THE PEOPLE: IT MUST FOSTER THEIR INTERESTS AND DEVELOP THEIR INDUSTRY: THE WANT OF SUCH MAILS HAS CAUSED THE NEGLECT OF MANY PROFITABLE BRANCHES OF INDUSTRY: AS A CONSEQUENCE WE HAVE LOST IMMENSE TRAFFIC: THE EUROPEAN MANUFACTURING SYSTEM AND OURS: FIELDS OF TRADE NATURALLY PERTAINING TO US: OUR ALMOST SYSTEMATIC NEGLECT OF THEM: WHY IS GREAT BRITAIN'S COMMERCE SO LARGE: CAUSES AND THEIR EFFECTS: HER WEST-INDIA LINE RECEIVES A LARGER SUBSIDY THAN ALL THE FOREIGN LINES OF THE UNITED STATES COMBINED: INDIFFERENCE SHOWN BY CONGRESS TO MANY IMPORTANT FIELDS OF COMMERCE: INSTANCES OF MAIL FACILITIES CREATING LARGE

TRADE: THE PENINSULAR AND ORIENTAL COMPANY'S TESTIMONY: THE BRITISH AND BRAZILIAN TRADE: SOME DEDUCTIONS FROM THE FIGURES: CALIFORNIA SHORN OF HALF HER GLORY: THE AMERICAN PEOPLE NOT MISERS: THEY WISH THEIR OWN PUBLIC TREASURE EXPENDED FOR THE BENEFIT OF THEIR INDUSTRY: OUR COMMERCIAL CLASSES COMPLAIN THAT THEY ARE DEPRIVED OF THE PRIVILEGE OF COMPETING WITH OTHER NATIONS.

1. *Conceded* (SECTION I.) *that steam mails upon the ocean control the commerce and diplomacy of the world; that they are essential to our commercial and producing country; that we have not established the ocean mail facilities commensurate with our national ability and the demands of our commerce; and that we to-day are largely dependent on, and tributary to our greatest commercial rival, Great Britain, for the postal facilities, which should be purely national, American, and under our own exclusive control:*
2. *Conceded* (SECTION II.) *that fast ocean mails are exceedingly desirable for our commerce, our defenses, our diplomacy, the management of our squadrons, our national standing, and that they are demanded by our people at large:*
3. *Conceded* (SECTION III.) *that fast steamers alone can furnish rapid transport to the mails; that these steamers can not rely on freights; that sailing vessels will ever carry staple freights at a much lower figure, and sufficiently quickly; that while steam is eminently successful in the coasting trade, it can not possibly be so in the transatlantic freighting business; and that the rapid transit of the mails and the slower and more deliberate transport of freight is the law of nature:*

4. *Conceded* (SECTION IV.) *that high, adequate mail speed is extremely costly, in the prime construction of vessels, their repairs, and their more numerous employées; that the quantity of fuel consumed is enormous, and ruinous to unaided private enterprise; and that this is clearly proven both by theory and indisputable facts as well as by the concurrent testimony of the ablest writers on ocean steam navigation:*
5. *Conceded* (SECTION V.) *that ocean mail steamers can not live on their own receipts; that neither the latest nor the anticipated improvements in steam shipping promise any change in this fact; that self-support is not likely to be attained by increasing the size of steamers; that the propelling power in fast steamers occupies all of the available space not devoted to passengers and express freight; and that steamers must be fast to do successful mail and profitable passenger service:*
6. *Conceded* (SECTION VI.) *that sailing vessels can not successfully transport the mails; that the propeller can not transport them as rapidly or more cheaply than side-wheel vessels; that with any considerable economy of fuel and other running expenses, it is but little faster than the sailing vessel; that to patronize these slow vessels with the mails the Government would unjustly discriminate against sailing vessels in the transport of freights; that we can not in any sense depend on the vessels of the Navy for the transport of the mails; that individual enterprise can not support fast steamers; and that not even American private enterprise can under any conditions furnish a sufficiently rapid steam mail and passenger marine: then,*

   The inference is clear and unavoidable, and we come irresistibly to the conclusion, that it is the duty of the Government to its people to establish and maintain

an extensive, well-organized, and rapid steam mail marine, for the benefit of production, commerce, diplomacy, defenses, the character of the nation, and the public at large; and as there is positively no other source of adequate and effective support, to pay liberally for the same out of any funds in the national treasury, belonging to the enterprising, liberal, and enlightened people of the Republic. There is no clearer duty of the Legislative and Executive Government to the industrious people of the country than the establishment of liberal, large, and ready postal facilities, for the better and more successful conduct of that industry, whether those facilities be upon land or upon the sea. It is sometimes difficult to extend our vision to any other sphere than that in which we move and have our experiences; and thus there are many persons who, while they would revolt at the idea that the Government should refuse to run four-horse coaches to some little unimportant country town, would be wholly unable to grasp the great commercial world and the wide oceans over which their own products are to float, and from whose trade the Government derives the large duties which prevent these same persons having to pay direct taxes. They do not understand the necessity of commerce, to even their own prosperity, or of the innumerable steam mail lines which must convey the correspondence essential to the safe and proper conduct of that commerce. But the great mass of the American people understand these questions, understand the reflex influences of all such facilities, and knowing how essential they are to the proper development of enterprise and industry in whatever channel or field, boldly claim it as a right that easy postal communication shall be afforded them as well upon the high seas as upon the interior land routes.

It is generally admitted that the government of a country is established for the benefit of the people; and constitutions conflicting with this purpose are simply subversive of justice and liberty. If labor is a thing so desirable and so noble in a people that the protection of its rewards in the form of property becomes one of the highest attributes of good government, then it is equally an indisputable attribute of that protecting and fostering government to afford those facilities to labor, which experience shows that it needs, and which the people can not attain in their individual capacity, or without the intervention of the government. It is idle for a government to say to the people that they are free, when it denies to them the ordinarily approved means of making and conserving wealth. The common experience of mankind points to commerce as the next great means to production in creating national and individual wealth. It equally shows us that foreign commerce can not flourish without liberal foreign mail facilities, and the means of ready transit of persons, papers, and specie. It also clearly indicates that the most successful means of accomplishing this, is the employment of subsidized national mail steamships. It therefore becomes obviously the duty of a paternal government to an industrious, enterprising, producing, and trading people, to give them the rapid ocean steam mails necessary to the profitable prosecution of their industry.

We have for many years neglected many important fields of foreign trade, and many profitable branches of industry and art, which we could easily have nurtured into sources of income and wealth, by adopting the foreign mail system, so wisely

introduced and extended by Great Britain. And in the absence of such efforts on our part, a large and remunerative traffic has been swept from us, and this suicidal neglect has been the means of our subordination to so many controlling foreign influences. We are at this very hour commercially enslaved by England, France, Brazil, and the East. How is it that the trade of the world is in the hands of Great Britain; that she absorbs most of every nation's raw material; and that she and France supply the world with ten thousand articles of industry, that should furnish work to our manufacturers, and freight to our ships? There are some who will say that it is because of her manufacturing system. Grant it. But how did she establish that imperious, and overshadowing, and powerful system, and how does she keep it up? Her energetic people have ever had the fostering care of her government. Their steam mail system has been established for twenty-four years. It has furnished the people with the means of easy transport, rapid correspondence, the remittance of specie, and the shipment of light manufactured goods to every corner of the world; it has invited foreigners from every land to her shores and her markets; and it has been the means of throwing the raw material of the whole world into the lap of the British manufacturer and artisan, and enabling them thus to control the markets in every land.

But we can get along, it is said, without such a manufacturing system and such an ubiquity of trade. This is a mistake. The productions of our soil are not sufficiently indispensable to the outer world to bring us all of the money we need for importing the millions of foreign follies, to which our people have become attached. It is not right or best for us that

while our "Lowell Drillings" stand preëminent over the world, we should so far neglect the Brazilian, La Platan, New-Granadian, Venezuelan, and East-Indian trade, that Manchester shall continue, as she now does, to manufacture an inferior fabric, post it off by her steamers, forestall the market, and cheat us out of our profits; and that, by means of the reputation which our skill has produced. And a few more crises like the one through which we have just begun to pass, will open our eyes to the necessity of doing something ourselves to make money, and show that foreign trade in every form, and the sale of every species of product known to the industry of a skillful people, must be watched with jealous national and individual care, and nurtured as we would nurture a young and tender child. There are many fields of trade which may be said to pertain naturally to this country, and which we have as wholly neglected and yielded to Great Britain, as if she had a divine right to the monopoly of the entire commerce of the world. No one can believe that the trade of the islands which gem the Carribbean Sea and the Gulf of Mexico, or the great Spanish Main, or the Guianas, or the Orinoco and Amazon, or the extended coast of Brazil, the Platan Republics, or Mexico, and the Central American States lying just at our door, belongs naturally to Europe, or that their productions should be transported in European ships, or that their supplies come naturally five thousand miles across the ocean, rather than go a few hundred miles from our own shores, in our own ships, and for the benefit of our own merchants and producers. Yet, such is the impression which our apathy of effort in those regions would produce. We have acted as if our people had no right of information concerning the West-Indies and South-America, until it had gone to

Europe and been emasculated of all its virtues.

The same thing is true of the Pacific South-American, the Chinese, and the East-Indian trade. That of the Pacific coast is not half so far from us, as it is from Europe; that of China, and the East-Indies, and Australia, is by many thousand miles nearer to us; and yet the greater portion of the commerce of all three of those great fields is triumphantly borne off by Great Britain alone. And why is all this? Why is her foreign trade sixteen hundred millions of dollars per year, while ours is only seven hundred millions? Causes can not fail to produce their effects; and prime causes, however little understood in their half obscure workings, are yet made manifest as the sun at noon-day by effects so brilliant and important as these. Here, as ever, the tree is known by its fruits. The tree of knowledge, of British wisdom, "whose mortal taste brought death into our world," our Western world of commerce, "with loss of Eden," and many a fair paradise of enterprise and effort, has filled the bleak little islands of Britain with the golden fruits of every clime, and scattered broadcast among its people the rich ambrosia of foreign commerce. When it was necessary to command the trade of the West-Indies, Central America, and Mexico, lying at our southern door, she established the Royal Steam Packet service with thirteen lines and twenty steamers, and paid it for the first ten years £240,000, and for the present twelve years £270,000 per annum. In addition to this she pays £25,000 per annum for continuing the same lines down the west coast of South-America to Valparaiso, and contracts to pay the Royal Mail Company an annual addition of £75,000 in the event of coal, freight, insurance, etc., being at anytime higher than

they were at the date of the contract in 1850. This aggregate sum of £295,000, or $1,475,000, to say nothing of the increased allowance of £75,000 probably now paid to this one branch alone of the British service, is considerably greater than that paid for the entire foreign mail service of the United States.

Now, it is a very extraordinary fact that, with such a field of commerce lying along the sunny side of our republic, and with such an array of facilities for converting it into European channels, our Government has done literally nothing to protect the rights of its citizens and give them the means, which they do not now possess, of a fair competition with other countries for this rich and remunerative trade. Yet such is the fact; all of the petitions and memorials of the seaboard cities to the contrary notwithstanding. The same is the case with the Pacific and East-India trade before noticed. While we have a noble chain of communication between the Eastern States and California and Oregon, which is manifestly essential to the integrity of the Union and the continued possession of our rich Western territory; while California is admirably situated to command the trade of those vast regions and concentrate it in the United States; while the British have several lines to China, the Indies, Australia, and Southern as well as Western Africa; and while our citizens have petitioned Congress year after year for even the most limited steam mail facilities to those regions, which could be afforded at the smallest price, it is truly astonishing that these facts and petitions have hitherto been treated with contempt, and almost ruled out of Congress as soon as presented. Such has been the course of action that,

instead of fostering foreign commerce and encouraging the enterprise and industry of the people, the Government has really repressed that enterprise, and practically commanded the intelligent commercial classes of this country to look upon foreign trade as forbidden fruit which it was never intended should be grown upon our soil.

It is not to be disputed that foreign mail steamers, by creating almost unlimited facilities for the conduct of trade, greatly increase the commerce of the nation with the countries to which they run. The evidences of this position are patent all around us, and too evident to need recital. The growth of our trade with Germany, France, Switzerland, and Great Britain since the establishment of the Bremen, Havre, and Liverpool lines of steamers has been unprecedented in the history of our commerce. That with California has sprung up as by magic at the touch of steam, and has assumed a magnitude and permanence in eight years which but for the steam mail and passenger accommodations created, could not have been developed under thirty years. The mail accommodations have wholly transformed our commerce with Havana and Cuba, until they are wrested from foreign commercial dominion, as reason suggests that they must ere long be from foreign political thraldom. As well might Europe attempt to attach the little island of Nantucket to some of her own dynasties as to deprive the United States of the control of the trade of Cuba so long as her steam lines are continued to that island.

Mr. Anderson, the Managing Director of the Peninsular and Oriental Company, recently testified before a Committee of the House of Commons, that, "the advantages of the communication (between

England and Australia) should not be estimated merely by the postage. After steam communication to Constantinople and the Levant was opened, our exports to those quarters increased by £1,200,000 a year. The actual value of goods exported from Southampton alone, last year, (1848-9,) by those steamers is nearly £1,000,000 sterling. Greek merchants state that the certainty and rapidity of communication enable them to turn their capital over so much quicker. Forty new Greek establishments have been formed in this country since steam communication was established. The imports in that trade, fine raw materials, silk, goats' hair, etc., came here to be manufactured. Supposing the trade to increase one million, and wages amount to £600,000, calculating taxes at 20 per cent., an income of revenue of £120,000 would result from steam communication."

I am prepared to speak from my own observation, and from the reliable statistics of the Brazilian Government, from the pen of the late Prime Minister, the *Marquis of Paraná*, a few facts of the same nature relative to the trade between Great Britain and the Brazilian Empire. In a paper which I prepared for the New-York Historical Society, and published in "*Brazil and the Brazilians*," Philadelphia, Childs & Peterson, I said, at page 618, in speaking of the trade of Great Britain:

"From 1840 to 1850 her total imports from Brazil made no increase. In 1853, they had advanced one hundred and fifty per cent. on 1848; and, in 1855, they had advanced over 1848—or the average of the ten years noticed—about three hundred per cent. This, however, it must be recollected, was in coffee, for reëxportation; a trade which was lost to our

merchants and to our shipping. Her total exports to Brazil from 1840 to 1850 were stationary at about two and a half million pounds sterling annually. In 1851—the first year after steam by the Royal Mail Company—they advanced forty per cent.; and, in 1854, they had advanced one hundred and two per cent. on 1850. Thus, her exports have doubled in five years, from a stationary point before the establishment of steam mail facilities; whereas ours have been thirteen years in making the same increase. The total trade between Brazil and Great Britain has increased in an unprecedented ratio. The combined British imports and exports, up to 1850, averaged £3,645,833 annually; but, in 1855, these had reached £8,162,455. Thus, *the British trade increased two hundred and twenty-five per cent. in five years after the first line of steamers was established to Brazil*."

In the analysis of the tables presenting these facts I had occasion to make the following deductions, page 619:

"We see, from a generalization and combination of these tables and analyses, that our greatest advance in the Brazilian trade has arisen from imports instead of exports; whereas the trade of Great Britain has advanced in both; and particularly in her exports, which were already large; the tendency being to enrich Great Britain and to impoverish us: that until 1850 her exports were stationary, while ours were increasing; due, doubtless, to the superiority of our clipper ships at that period, which placed us much nearer than England to Brazil: that she is now taking the coffee-trade away from us, and giving it to her own and other European merchants and shipping: that she is rivalling us in the rubber-trade; wholly

distancing us in that of manufactures: and that from 1850 to 1855 she has doubled a large trade of profitable exports, and increased her aggregate imports and exports two hundred and twenty-five per cent.; whereas it has taken us thirteen years to double a small trade, composed mostly of imports: it being evident that, with equal facilities, we could outstrip Great Britain in nearly all the elements of this Brazil trade, as we were doing for the ten years from 1840 to 1850.

"It will hardly be necessary to suggest to the wise and reflecting merchant or statesman the evident causes producing this startling effect. It is the effect of steamship mail and passenger facilities, so well understood by the wise and forecasting British statesmen who established the Southampton, Brazil, and La Plata lines; not as a means of giving revenue to the General Post-Office, but of encouraging foreign trade and stimulating British industry. If England by steam has overtaken and neutralized our clippers and embarrassed our trade, then we have only to employ the same agent, and, from geographical advantages, we feel assured that we will soon surpass her as certainly, and even more effectually, than she has us. She sweeps our seas, and we offer her no resistance or competition. Not satisfied with the Royal Mail lines, it is reported that she is making a contract with Mr. Cunard to run another line along by the side of the Royal Mail, from Liverpool to Aspinwall, and from Panamá to the East-Indies and China. She gains in these seas an invaluable trade, because she employs the proper means for its attainment and promotion, while we do not. Hence, although much farther off she is practically much nearer. Suppose that Great Britain

had no steamers to the great sea at her threshold, the Mediterranean; and we had the enterprise to run a great trunk-line to Gibraltar and Malta, and nine branches from these termini to all the great points of commerce in Mediterranean Europe, Asia, and Africa. Would we not soon command the trade of all Southern Europe, of Western Asia, and of Africa? But we find her wisely occupying her own territory, and that it is impossible for us to get possession. If we had been there, she would soon have given us competition. But Great Britain did not wait for competition to urge her to her duty to her people. She could easily have continued the trade already possessed; but she could enlarge and invigorate it by steam, and she did it; not from outside pressure, but for the advantages which it always presents *per se*. For the same reason we should have established steam to the West-Indies, Brazil, the Spanish Main, and La Plata long since; to foster a trade naturally ours, but practically another's. It is preeminently necessary now when steam, under the system of Great Britain, is ruining our trade; whereas, by a similar process, we could reëstablish ours, if not paralyze theirs. Neutrality is impossible. Indifference to the present posture of affairs only leads to the ruin of our interests. We must advance and contend with Great Britain and Europe step by step, and employ the means of which we are generally so boastful, or we will be forced to retreat from the field, and be harassed into ignominious submission."

As in the case of Brazil and La Plata so is it in that of the Pacific South-American States, and the great fields of Australia, China, and the East-Indies generally, as before noticed. The trade of Great Britain with those regions has gone on at a rate of

progression truly astonishing. Ours has continued just as much behind it as the slow and uncertain sailing vessel is behind the rapid and reliable mail steamer. Our Pacific possessions have been shorn of half their glory and power by the refusal of those steam aids which would by the present time have converted half the commerce of the fields mentioned into the new channels of American enterprise and transport. The injustice has operated equally against the people of California and Oregon, and against ourselves of the East; while there is no good and valid reason for thus making the Pacific coast the *ultima thule* of civilized, steam enterprise. The people of the United States, of whatever class, are far from being misers. They do not desire an economy of two or three millions of dollars per year, which would give them great opportunities of obtaining wealth and power, merely that the sum so economized may be squandered, with twenty or thirty millions more, on schemes of doubtful expediency, and of no real or pressing necessity. They do not, indeed, ask that these mail accommodations may be paid for simply because much money is uselessly otherwise spent; but because these accommodations are necessary to themselves, to the development of their enterprise and labor, and to the general good of all the active and industrial, and, consequently, all of the worthy classes. It is a question of little importance to the great people of this country, whether the Government expends forty millions per year or eighty millions. But it would be a delightful consolation to them to know that while they might be paying ten, twenty, or thirty millions per year more than strictly necessary, three or four millions of it at least were so appropriated as to better enable them to pay the large general tax for the aggregate

sum. No one hears any complaint regarding the sum necessary to support the General Government, except by those in remote districts, who have but an infinitesimal interest involved, but an imaginary part of the sum to pay, and who, producing but little, and having nothing to do, assume the right to manage the affairs of those who really have something at stake. The American people are willing and anxious that their money shall be expended for their own benefit, for the benefit of those who are to come after them, and for the glory of our great country.

The many instances of our dereliction in the establishment of steam mail facilities, and the failure to establish locomotive accommodations for our merchants and other business classes call loudly for a change in our affairs, and the establishment of a national steam policy in the place of the accidental and irregular support hitherto given to foreign steam enterprise. The nation demands the means of competing with other nations. We have lost much of the trade of the world without it. The commercial men of this country complain bitterly that the Government gives them no facilities for conducting our trade or cultivating the large fields of enterprise successfully which I have named, and competing, on fair terms, with foreign merchants. They see the West-Indies, the Spanish-American Republics, Brazil, Central America, and Mexico, lying right at our southern door, and the whole Pacific coast, the East-Indies, China, the Mauritius, Australia, and the Pacific Islands but half as far from California as from England, all much nearer to us than to Great Britain and other European countries, and offering us a trade which large as it necessarily is to-day, is yet destined within the coming generation to transcend that of all

other portions of the globe combined, in extent, in richness, and in the profits which it will yield. The capacity of these great fields for development and expansion is indefinite and almost boundless. There is no doubt that an American trade could be developed in those regions within the next thirty years whose opulence and magnificence would rival and far surpass our entire commerce of the world at the present time, and give to our nation a riches and a power which would enable it to shape the destinies of the entire civilized world.

Our commercial classes complain not so much that Great Britain has the *monopoly* of this trade, which naturally belongs to the United States; not so much that she conducts that trade by *steam facilities*, to the detriment of us who have none; not so much that she has *lines of steamers* by the dozen, and weekly communication, as well as the advantage and use of all the other European lines; but that the citizens of the United States are not permitted to enter into a fair competition for this trade. Our people probably surpass every other people in the world in individual and aggregate enterprise and energy. They ask as few favors of the Government as any people on earth; doing every thing that is practicable, and that energy and capital can accomplish, without the intervention of the Government. But there are some things that, with the entire concentrated skill and ability of the nation, her citizens can not accomplish; and one of these is the maintenance of steamship mail lines upon the ocean. In ordinary enterprises competition necessitates improvement; and mechanical improvement and skill, in due course of time, enable individuals to compass ends otherwise deemed impracticable and unattainable. These attempts have

all been made, in every form, with ocean steam navigation. It was supposed, as elsewhere stated, that, by superior engines and great economy of fuel, a speed high enough for all ordinary mail purposes could be attained, and yet leave enough room for freight and passengers to enable the income from these, at rates much higher than on sailing vessels, to pay for fuel, engineering, and the great additional cost of running a steamer. Vast engineering skill and ability have been directed to this point both in this country and Europe; and this object has been declared the commercial desideratum of the age. But all of these efforts have failed in their design; so much so that there is not, to-day, more than one permanent steam line upon the high seas of the whole world which is not sustained by a subsidy from some government. Many attempts have been made by British merchants to do a freighting and passenger business in *propellers,* without any mail pay, and depending on their receipts alone. These, too, have all failed. No permanent line of these propellers has been established to any of our American cities, except by subsidized companies, owning side-wheel steamers also.

The only trade in which it has ever been supposed that steamers of any description whatever could carry freight is that between Europe and the United States, where there are large quantities of rich, costly goods, in small and valuable packages, which pay an extra rate of freight, as express goods; but, even here, the steam freighting system without governmental aid has proved a failure. There have been one or two cases where a steamer could make money in carrying freight and passengers alone, as between this country and California during the early part of the gold crisis,

and owing to the great distance around the Horn, as well as an unnaturally large passenger trade. This, however, was a state of commerce wholly abnormal and of short duration, and such as is not likely to occur once in a century, or last very long; or prove more than an infinitesimal exception to the great general laws of freighting and commercial transport.

Great Britain has learned this doctrine from experience, and is profiting by it. Her wise merchants and statesmen know that commerce can be accommodated only by rapid steam mails, which have regular and reliable periods for arrival and departure; and that, although these mails cost the Government and the people something more than those slow and uncertain communications which depend on sailing vessels and overland transit, yet they are enabled, by the facilities which they afford, to monopolize and control the commerce of the world, and divert it from even the most natural channels into the lap of British wealth. It is in this view of the subject that our merchants so justly complain that our Government, by refusing to give them the facilities commensurate with the demands of the age, *deprives* them of the *power* or *privilege* of competing with foreign nations, and palsies their hands, simply because they are not able, individually and by their associated capital, to do that which the Government only can do. The reason why our mail steamers require the aid of our Government is that foreign Governments subsidize their lines; hence our individual enterprise can not compete with their individual enterprise and that of their Government combined. The reason why foreign Governments thus subsidize their mail lines is, that *those lines can not depend upon their own receipts for support, or run*

without Governmental aid. This is also the prime reason for Governmental aid in running our lines. These facts are undisputed by steamshipmen and merchants, and are verified by the practice of the whole world, and the great number of failures in attempting to sustain steamers, from year to year, on regular lines, by their receipts alone.

Being thus unable to compete with other countries under our present limited steam arrangements, and considering the startling expenses which attend the running of steamers, such as their fuel, their extra prime cost, their large repairs, their depreciation, their wages, their insurance, their dock charges and light dues, their shore establishments, and the long list which comes under the head of items and accidents, it is unquestionably the duty of the Government to meet this question in a frank and resolute manner, and afford to the people all those necessary facilities which they can get in no other way.

SECTION VIII.

HOW SHALL THE GOVERNMENT DISCHARGE THIS DUTY?

WE NEED A STEAM MAIL SYSTEM: HOW OUR LINES HAVE BEEN ESTABLISHED: AMERICAN AND BRITISH POLICY CONTRASTED: SPASMODIC AND ENDURING LEGISLATION: MR. POLK'S ADMINISTRATION ENDEAVORED TO INAUGURATE A POLICY: GEN. RUSK ENDEAVORED TO EXTEND IT: THE TERM OF SERVICE TOO SHORT: COMPANIES SHOULD HAVE LONGER PERIODS: A LEGISLATION OF EXPEDIENTS: MUST SUBSIDIZE PRIVATE COMPANIES FOR A LONG TERM OF YEARS: SHOULD WE GIVE TO OUR POSTAL VESSELS THE NAVAL FEATURE: OUR MAIL LINES GAVE AN IMPULSE TO SHIP-BUILDING: LET US HAVE STEAM MAILS ON THEIR MERITS: NO NAVAL FEATURE SUBTERFUGES: THESE VESSELS HIGHLY USEFUL IN WAR: THEY LIBERALLY SUPPLY THE NAVY WITH EXPERIENCED ENGINEERS WHEN NECESSARY: THE BRITISH MAIL PACKETS GENERALLY FIT FOR WAR SERVICE: LORD CANNING'S REPORT: EXPEDIENTS PROPOSED FOR CARRYING THE MAILS: BY FOREIGN INSTEAD OF AMERICAN VESSELS: DEGRADING EXPEDIENCY AND SUBSERVIENCY: WE CAN NOT SECURE MAIL SERVICE BY GIVING THE GROSS RECEIPTS: THE

GENERAL TREASURY SHOULD PAY FOR THE TRANSMARINE POST: REQUIREMENTS FOR NEW CONTRACTS: METHOD OF MAKING CONTRACTS: THE LOWEST BIDDER AND THE LAND SERVICE: THE OCEAN SERVICE VERY DIFFERENT: BUT LITTLE UNDERSTOOD: LOWEST-BIDDER SYSTEM FAILURES: SENATOR RUSK'S OPINION: INJURIOUS EFFECTS OF LOWEST BIDDER: INDIVIDUAL EFFORTS AND RIGHTS.

As it will scarcely be denied that the Government should furnish ample and liberal mail facilities, as well foreign as domestic, to its people, in view of the well-established fact that these facilities can not be attained in any other way, the question naturally arises, how shall the Government discharge this clear and unquestionable duty to the citizen? I trust that it will be admitted that we can not rely on the Sailing-ship mail, or the Naval steam mail, or the Private Enterprise mail; while it is equally evident that we can not depend on the Foreigner's mail, or should not if we could.

A first step toward this important end, and one which every interest of the country demands, is the establishment of a governmental steam mail system, a fixed steam policy, based upon common-sense, and guided by the dictates of justice to the enterprising citizen, at the same time that it is productive of certain efficiency toward the people. It can not be denied that our legislation on this subject has hitherto been that of expedients, and merely temporary arrangement. We have had no wise, immutable purpose, no great fixed rule of action. We have laid no broad foundations for a system which should extend itself wherever our trade extended, and work equitably with all of the large interests of

the American people. When, by a spasmodic effort, we opened communication in one direction, and found that we had a few steamers running, we became self-complacently satisfied with our action, shut our ears to all other equally urgent claims and appeals, forgot that we had simply commenced instead of having finished, and contented ourselves with the appearance of a mail system rather than its realization. When we established the two lines to Europe, which were positively necessary to commerce, it was not so much because those were the only necessary lines, but because they were urged by parties who stood ready to build the ships, and run them in the service. The California lines were established because the people would not longer tolerate the neglect of our large and important interests in the Pacific. But there were several other lines which were of the greatest importance to our commerce and manufactures, extending to fields where we could have established the richest trade, but which never enlisted the attention of Congress, simply because there was no one who made it his special business to press them. This of itself manifested great want of a matured steam mail system, which should operate equally on all of the great interests of the country, and extend its facilities wherever American industry and enterprise could find a footing.

We need not only a steam system, but a fixed steam policy that shall extend from generation to generation, and operate equally, as well at all times and in all fields of American enterprise, as upon all classes. No such system can be built up in one year or in ten years; much less by one spasmodic steam effort, even in the right direction, followed by an

eternal sleep, or a total indifference. It is the work of ages. It is not a system which, if set in motion, will work on perpetually of itself, without assistance. It needs constant care and fostering; and its results prove it worthy of all the care and attention that can be expended on it. The mature system of Great Britain has not grown up in a day. It has been constantly before the British public during twenty-four years, and has never been neglected for an hour. There has been no hiatus in it; for this would have disrupted the system, broken the chain, and resulted in disastrous failure. Neither has the one great purpose been changed every few years to suit the caprice of some new cabinet. It was a great cardinal idea, founded in reason and justice, that has gone on maturing from year to year; and none had the hardihood to touch it, or trifle with the people's purpose in establishing it; not even so far as to make it a passing text for demagoguery. It composed and yet composes a part of the far-reaching and controlling policy of the British crown; a purpose limited not to the visions of to-day, or the financial crises and panics of to-morrow, or to some new field of British effort, to be developed in a year or two; but limited to that time only, when men shall cease the strife of commerce, abandon the pursuit of wealth, yield the palm of enterprise, and unlearn the love of money and its power. There has been nothing spasmodic in this; nothing fitful, alluring, and evanescent; nothing that held out a hope to the enterprising man, and deceived him in all the essential conditions of its fulfillment in the end. It was founded in reason, founded in necessity; and it was well determined that it should endure.

It is creditable to the administration of President

Polk, that there was one effort made in this country to found a similar judicious and fruitful system. We had until that time taken no notice whatever of marine steam navigation; and British steamers swarmed around our coast north and south, thick as cruisers in a blockade. (*See Paper E.*) Indeed, it was a veritable blockade of our commerce, and told most disastrously upon our enterprise and independence. The Cabinet of Mr. Polk, headed by our present venerable Chief Magistrate of the Nation, determined to reverse this system, and did it as effectually as any thing can be accomplished in a country, where a given policy, however wisely inaugurated, has no guaranty or safeguard against the revolutionary changes of new administrations. They established a basis of action, and inaugurated three steam lines under contracts which placed them beyond the attacks of the capricious; well knowing that if the system had merits, they would be manifested to the country within ten years by the fruits of these lines. The period was shorter than that designated by Great Britain; yet with the immensely rapid development of our people it inwrought itself into the affections of the public so effectually, even in this short time, that none will dare risk his reputation by attacking it boldly, or by other means than an indirect and harassing guerrilla warfare. But here the effort ended, and the system, deprived of the aids and new lines which Congress should have extended it, and of that continued development which was necessary to its perfection and usefulness, has been left to work itself out and die, until it may be resurrected by another great demonstration of public sentiment, and by an administration bold enough and far-seeing enough to grasp the interests of the whole country, and do itself and the people justice. It is due,

however, to the reputation of a lamented and departed statesman, the large-minded and noble Gen. Rusk, of Texas, to say that he made a manly and systematic effort in 1852, after seeing the fruitful workings of the three lines noticed, to extend, enlarge, and fortify the good beginnings of President Polk and Secretary Buchanan, by inaugurating several new lines, and establishing a permanent and recognized basis of action. But in all this he was thwarted by the machinations of narrow-minded men, who deemed it a higher effort to agitate the country and endeavor to separate the North and the South, than establish and secure those mighty aids to industry which should give development, wealth, strength, and security to the whole American Union, and check the fratricidal blow of the disunionist.

It is essential that we shall have in this country a policy on this subject, which shall remain untouched under the changes of administrations, just as standard commercial laws and regulations remain untouched. No system of such magnitude can mature or cheapen when but a few years are assigned to it, and when there is no certainty that it will survive the life of a single ship. Companies undertaking the mail service under such circumstances must be paid larger sums for their general establishment, that they may be enabled to meet the exigencies and caprices of irregular legislation, which may at the close of their contracts suddenly throw a dozen good ships out of employment. Every well-regulated and efficient company necessarily builds new steamers through all the stages of its existence; and when the term of its service expires, necessarily has several partially new ships. If the term of service is to be short, and if there is no rule by which those who do good service

on a line are to have, in renewing contracts, the preference of new and untried parties, then it is reasonable to infer that they can not themselves incur the expense of so large an establishment of new and useless vessels, and that their service is either to be inefficient and unreliable, or that the department must pay a larger price than necessary under a judicious and fixed system. The want of a reliable system operates injuriously both on the department and on the contractors. It subjects us to expedients, and to all of the evils of constant lobbying and legislation on the subject. And one of the first wants of this system is an extension of the term of contracts. The period hitherto assigned has not been long enough for the proper development of the service. The short term is a constant premium for building an inferior class of vessels, which shall have become worthless by the time that the contract expires, so as not to entail loss upon the company. Such vessels are ever unfit for the mails or passengers. Short terms also keep the subject continually before Congress and the Executive Government, and foster that extensive and depraved lobbying which has wrought so injuriously on our legislation. Moreover, there is no reason why the term of service should not be extended, when it will certainly simplify and cheapen it, if, as I have assumed, the progress of engineering is not such as to throw well-built ships out of use within twelve years, or in any way introduce improvements by which the Government could get the service at lower rates. Nor have we any reliable hope for the future. We wait until commerce has been perverted into unnatural channels, and then become suddenly and galvanically aroused, when it is too late to effect a change until two or three years have expired in

building ships. We thus find ourselves in the midst of the difficulty without having foreseen it, and without being prepared for it. The wise man planned the campaign before others had even contemplated any disturbance of the peace. As a matter of course he controlled the battle, and brought up the victory in his own way.

The only effectual means of accomplishing the foreign mail service in this country is by liberally subsidizing private companies for a long term of years, such as will induce them to provide first-class ships, run them rapidly, and fit them for the most comfortable conveyance of passengers. Lord Canning in his Report to both houses of Parliament on the contract packet system in 1853, says, after showing that the naval vessels have been abandoned for the mail service: "There is no peculiarity in this branch of business which renders it an exception to the general rule, that work is done more cheaply by contract than by Government agency." But when the idea of performing the mail service by naval vessels was wholly abandoned in 1837, another question of equal importance arose, as to how far the mail steam packets might be made efficient as vessels of war in times of emergency. As a consequence of the discussion nearly all of the mail contracts made from that day until this by Great Britain contained stipulations requiring the vessels to be capable of carrying an armament, in addition to the requirements of speed and punctuality. The same thing was done in this country in 1846-7; and one of the principal means of carrying the Collins bill through Congress was the self-deception of making the steamers equivalent to vessels of war. It was a plea to which statesmen and enterprising business

men resorted, and was used as a means of securing those commercial facilities which constitutional quibblers would not vote for directly, but which they would afford if allowed the subterfuge of "defenses" as a means of protecting them against a certain set of constituencies who foolishly opposed the extension of commerce. Many of these would not grant one dollar for the aid of that commerce on which the revenues of the country and their own real prosperity and wealth depended; but they were willing to suffer long and bleed freely at the old and just, though unrenewable war-cry: "The British and the Hessians." Our case was rather different from that of Great Britain which had a large steam navy while we had neither naval nor commercial steamers. There was, consequently, and there yet is, more propriety in demanding a capacity for the naval service in our vessels than in the case of Great Britain.

In obedience to this very proper spirit we produced some of the noblest vessels that ever floated. Stronger vessels than the Collins, Aspinwall, and Pacific Mail Steamers were never built in any country. And although we have fortunately not been compelled to test their capacity in naval transport or in action, yet there is no doubt that they would do honorable and efficient service in both, and by no means sully the glory of the American colors. The establishment of these and the Havre and Bremen lines, certainly gave an impulse to shipbuilding and the manufacture of steam machinery in this country which could have been given in no other way, and which in a few short years has demonstrated that we are behind no people on earth in capacity for these noble and difficult arts. And although we are yet but in our infancy in experience, as compared, especially

with Great Britain, yet the increasing demand for mail facilities, the necessity for a large war marine, and the rapidly increasing coast steam service, all indicate that we shall require a large amount of this class of work and a mechanical skill to which our ingenious countrymen have thus proven themselves entirely adequate. And although it is certainly indispensable that we shall ever be provided adequately against all the exigencies of foreign war, yet it is to be trusted that bold and fearless statesmen will support and extend our steam mail service on the tenable grounds of its necessity to commerce and our citizens at large, and that its productive services will not be obscured by or subordinated to the subterfuges and deceits of the war marine feature. Let us have steam mail facilities on high and independent grounds, and for their benefits *per se*. The system is abundantly tenable on this ground alone; on this only ground that it will probably ever practically occupy. Let us also have our war marine, efficiently separate, as it should be. Let both systems be perfect, both independent, both mutually conducive to the prosperity and the defense of the country. But there is no doubt that these vessels would do excellent service in a conflict. They could swarm any particular coast with troops in a few days. They could easily run away from dangerous vessels, or pursue and overtake others when necessary. They are alway needed for transport, while the time will probably never again come when mail steamers will not be even more necessary during war than in times of peace. But this is not all. They fit and train a large number of marine engineers who are ever ready at a day's warning to enter efficiently on the naval service. This is a point of greater importance than is generally supposed.

Engineers, however skilled in the shops, are wholly unfit for the service at sea until they have had months of experience, and become accustomed to sea-sickness. When one of our first American mail steamers sailed for Europe, no practised marine engineer could be found to work her engines. They took a first-class engineer and corps of assistants from one of the North River packets; but as soon as the ship got to sea, and heavy weather came on, all the engineers and firemen were taken deadly sick, and for three days it was constantly expected that the ship would be lost.

It is abundantly evident from all of the testimony, that most of the mail packets are capable of carrying a handsome armament. Mr. Atherton says to me in his letter: "Many of our ocean steamers are fit for naval service of every description; and they are generally fit for all transport service." The Report of Lord Canning, the British Post Master General, to which I have referred, was made in 1853, in obedience to a Treasury Minute issued by the Chancellor of the Exchequer, who directed the Post Master General to form a committee, and report to both houses, on the propriety of continuing and extending the mail steam packet system; as there had been suggestions that the sum expended for the mail service was large. These gentlemen after a lengthy investigation of several months, the examination of a great number of witnesses, and the record of their testimony in shorthand, made their report, accompanied by the evidence in a large volume. At page 5 of the report, in speaking of the requirements for naval efficiency, they say:

> "In arranging the terms of these contracts, the Government seized the opportunity of

requiring that the vessels should be constructed in a manner that would render them as serviceable for national defense in war as steam-packets belonging to the Crown would have been if employed in their stead. A provision to this effect was first inserted in the contract with the Royal Mail Company in 1840; and in most of the existing contracts stipulations are to be found requiring that the vessel should be of a construction and strength fit to carry such an armament as the Admiralty may think proper. In several cases they must be built of wood and not of iron; and there are some contracts which confer on the Admiralty the right of taking the ships at a valuation when it may be thought desirable to do so.

"Generally speaking, these stipulations have been fulfilled, as appears from a return which has been laid before us by the Surveyor of the Navy, showing the number, tonnage, and power of the vessels constructed by the various companies under contract with the Admiralty for the conveyance of the mails, distinguishing those built of wood from those built of iron, and stating whether the companies have in any cases violated the terms of the contracts, and if so, whether any authority has been given by the Board of Admiralty for the deviation. It results from this return that out of 98 vessels which had been surveyed by the Government officers, one only (the 'Australian') has been reported as incapable of carrying guns if required, and two iron

vessels (the 'Levantine' and the 'Petrel') have been accepted instead of wooden vessels, on Mr. Cunard's Halifax and Bermuda line. Two other vessels—one belonging to the Australian Royal Mail Company, and the other to Mr. Macgregor Laird's West Coast of Africa line—had also been accepted (temporarily) by Admiralty authority, although of less tonnage and power than the contracts prescribed.

"The Surveyor's report upon most of these vessels, as regards their fitness for war purposes, is in the following terms: 'Not fitted for armament, but capable of carrying guns when so fitted.' This report accords with the opinion expressed by the Committee of Naval and Artillery officers upon the vessels which have come under their notice. It appears, however, from the statements of that Committee, that although the packets they have examined are for the most part of sufficient strength to carry and fire a certain number of guns, the expense of the alterations which would be necessary before they could be got ready for service would be very considerable, and that even when such alterations had been made, the efficiency of the vessels would be very small in proportion to their size, and that they could not encounter hostile vessels of equal tonnage without endangering the honor of the British flag.

"With reference to future contracts, we are decidedly of opinion that no expense should be incurred for the sake of imposing

> conditions for giving a military character to the postal vessels. We believe the imposition of such conditions to be a measure of false economy. *Should a war suddenly break out, the immediate demand for mail steamers would probably be greater than ever, and it might be exceedingly inconvenient to withdraw them at such a time from their legitimate use for the purpose of arming them for battle.* Moreover, the high charge for the packet service has been borne with the greater readiness, because it has been supposed by some to include a provision of large but unknown amount, for the defense of the country; while on the other hand the Naval Estimates have sometimes been complained of as excessive, on the ground that the force provided for was in addition to the large reserve of postal war steamers. We accordingly recommend that for the future the contracts for the conveyance of the mails should be wholly free from stipulations of the nature we have been describing, though it may be desirable in some cases to retain the power in the Government to take possession of the vessels in the event of national emergency."

Again, in the *resumé*, after considering each of the British lines separately, the committee say:

> "An erroneous impression appears to have prevailed among the public as to the efficiency of our postal steamers for direct purposes of warfare. We do not believe that those who are charged with the direction of the military affairs of the country have ever regarded them as likely to be of any great

> service in an engagement; but their advantages as an auxiliary force will be very considerable. They will be available, in the event of the breaking out of hostilities, for the rapid conveyance of dispatches, of specie, and, to a certain extent, of troops and stores. Their speed will be such as probably to secure them from the risk of capture, and will render them highly valuable for procuring intelligence of hostile movements. They may also be expected to furnish the Queen's ships with men trained to steam-navigation, and possessing an amount of local knowledge which can not fail to be valuable in several ways."

We have arrived at about the same conclusions in this country as those presented by the British Post Master General to Parliament in 1853, on this subject. And yet, with our small navy we may at any time need all of our steam packets for actual service, and the Government should always have the right to demand them for transport service. We have abundant evidence that our mail packets are well fitted for carrying an armament, and being highly efficient in war duty. The testimony of Commodore M. C. Perry, Mr. Cunningham, and others, as published in the Special Report of the Secretary of the Navy, 1852, is conclusive on this point. They found that they were built with extraordinary strength and of good materials.

Many expedients have been proposed for the transmission of our foreign mails. It is said that the late Post Master General entertained the purpose of paying some of the foreign screw lines to carry the mails, if Congress would permit it; but however all

parties disapprove of the contracted policy proposed by that gentleman, I can not believe that he entertained any purpose so unpatriotic, and so subversive of American shipping interests. It is true, however, that, as he frequently said, he would prefer returning to the old packet system, and carrying the mails by sail, if private enterprise could not carry them across the ocean without a subsidy. But it is a consoling reflection that these singular views of that worthy gentleman never anywhere took root in Congress. Certainly there is no reason why this great, and rich, and proud nation should resort, like some little seventh rate power, to expedients in the carriage of our ocean mails. We are not so poor as to have to live by practices; not so degraded as to be willing to catch at any little thing that may pass along for resources. We have a teeming prosperity, an abundant wealth, unending resources, and a people everywhere clamorous for liberal expenditures for adequate mails. Why shall we degrade ourselves by depending upon others for our mail facilities? It alway humbles and mortifies me to see one human being lick the hand of another; one who acknowledges himself a stupid drone that must needs have a master to direct and protect him. And so with our nation when she stoops to subserviency and begging, for even so much as the postal charities of other enterprising and commanding nations.

It has been suggested that the Government could secure the transit of the mails on the receipts, taking both ocean and inland postage; and indeed a temporary arrangement was made with two of our contending companies running to Europe, to transport them on these terms; but such arrangements are temporary only, and can not be

made the basis of regular action. They would operate most unequally on different lines. While on the European lines they would pay probably one half the sum of subsidy required, on many other, and especially on new and untried lines, they would not at first pay probably one tenth. And granting that on a given line, the receipts during fifteen years would amount to as much as the whole subsidy required for that time; yet no company could live on them, as for the first few years the receipts from the mail would be very small, while the general income of the line from passengers and freight would also be smaller than at any other time. Moreover, almost every steam company has to borrow money largely during its first years, in anticipation of the larger income from increased trade during the last years of its existence. Thus, while the system of the receipts would operate most unequally, the same aggregate sum given in the form of a regular annual subsidy operates as an assurance for the company and keeps it alive. But the postal receipts are not adequate to the support of any ocean line. In the report before cited, the Committee say, at page 5, that the sum of subsidy then paid was £822,390 per annum, whereas the postal receipts were only £443,782, or but a fraction over one half. There is probably no regular service in the world where the postal receipts would pay for the transport, especially where competition existed.

In making our contracts common-sense must dictate the lines necessary, and the general treasury should pay for them. There is no good reason why the sums of subsidy to be paid for mail transportation should be chargeable on the Post Office Department. Nor is it really of much consequence where the account is

settled, as the general treasury must after all meet the bills. It may create some misapprehension as to the services on which the sums annually voted are bestowed. But the service, whether sea or inland, is alike incapable of sustaining itself, and is alike beneficial to every citizen of the Republic. And as this service so greatly benefits commerce, it is well that it should be paid from the general revenues of the country; from the duties which it creates. At any rate, almost every Post Master General will feel better disposed to subsidize ocean mail steamers adequately if the bills are payable by the treasury department, and not chargeable upon his own.

It would be well in all new contracts that the law of Congress authorizing them should require strength of vessel, a fair dynamic efficiency of performance, water-tight bulkheads for the safety both of the vessel, and passengers and mails, and all those other safeguards compatible with speed and mail efficiency. But the most essential point is the mode of making the contracts. We have pursued two system in this country, that of the lowest bidder, and that of Congressional contracts. Some have supposed that as the land mails are submitted to the lowest bidder, so those of the ocean ought to be also. But the cases are very unlike. The land service is a familiar thing, which every farmer understands, because running a wagon is one of the first things in life that he learns. Every body is familiar with the land service, and every body has more or less experimented in it, or in something very similar to it. But it is far otherwise with that of the ocean. Steamshipping is a comparatively new, a very difficult, and a very little understood science. But few who know its difficulties will undertake its hazards. Steam power and its

expenses are by no means understood by the people; and the first mistake made by those unacquainted with it is in supposing it much cheaper than it really is. This mistake leads to fatal consequences in bidding for the ocean service, as most of those unacquainted with the business would engage to perform a given service for less than the actual price that it would cost them, and certainly for much less than practical, experienced men would. And herein consists one of the evils of the lowest bidder system, that inexperienced persons taking such contracts either perform them inefficiently, or appeal constantly to Congress for relief, or for increase of their pay. Such cases are exceedingly numerous. Post Master General Campbell said that the lowest bidder system was "a nuisance." Senator Mallory declared in a debate about the close of the last Congress, that it was a system which never wrought efficiently, which never gave final satisfaction, and which generally brought in a set of adventurers. The department and members of Congress had experienced the annoyance and inefficiency of the system in the contract for carrying the mails between Key West and New-Orleans through the Gulf. It was several times given to the lowest bidder, and as often fell through; being finally awarded by private arrangement to other parties, at more than double the prices of the lowest bidders.

In the elaborate Report made in 1852 to the Senate by Gen. Rusk, as Chairman of the Committee on the *Post Office and Post Roads*, of which Messrs. Soulé, Hamlin, Upham, and Morton were members, in speaking on this subject the Committee said:

> "Contracts to carry the ocean mail should, like all other contracts made by the

Government, be the subjects of a fair competition, and granted with reference to the public good, due regard being had to the excellence of the proposals made, under all the circumstances of the cases which may present themselves. Your committee are aware that it has been too much the practice to regard the *lowest* as the *cheapest* bid; but experience has taught them that *lowness of price* and *cheapness in the end*, are not convertible terms, as the daily applications, from *low bidders*, to Congress for indemnity against losses incurred in the public service, will amply demonstrate. For examples of the kind the committee would respectfully refer to the numerous applications for remuneration, in connection with the public printing, which have for years past occupied the time and attention of Congress, and threaten to continue to do so to a most alarming extent, involving, in the end, an accumulation of expense infinitely beyond the cost that would have attended the performance of the work, at a fair and liberal compensation. This may be, by some, called economy, but it is the very worst sort of economy. It excludes the honest workman, who knows the real value of the service to be performed, and is unwilling to undertake to do his duty well, at the expense of himself and family; while it lets in the needy and greedy speculator who, having nothing to lose in point of character or money, will readily undertake what he can not perform, and become dependent upon the magnanimity of Congress for remuneration

> for his losses, real or fictitious. An honest and fair liberality should characterize the dealings between the Government and individuals, just as much as those between private citizens; and, when contracts are made, they should be entered into in the spirit of good faith, and with a full knowledge of the risks to be run, and the expenses to be incurred."

It is claimed on the other hand that in contracts made by Congress the two Committees have every opportunity of testing the value of the service to be performed, of ascertaining the sum of subsidy really necessary to its support, of giving to every applicant a fair and impartial hearing, and of presenting to Congress any case of doubt and difficulty, or of contested right. When the committees take any line into consideration it is in effect inviting competition and proposals from every one else than the projector who supposes that he has better claims to it, or can perform the service at cheaper rates. Such proceedings are always open and advertised to the world for months and sometimes for years. And there are many persons who will come forward and make a low bid for a service after some one else has brought it to the attention of the Government and labored it through Congress, who would not turn their fingers over, or risk a dollar in bringing it before the nation, and securing for it a due consideration. These are the adventurers who never produce any thing themselves by a legitimate and honest effort, but who alway stand back to take the chances of wresting from some enterprising, more far-seeing, and more industrious person the fruits of the toil perhaps of years. There are many enterprises

in which the public have taken no interest because ignorant of the facts. Some enterprising individual goes zealously to work, travels thousands and tens of thousands of miles, ascertains all of the facts bearing upon the question, determines its feasibility or its impracticability, spends years of time and toil, and many thousands of dollars of money, indoctrinates the people of his country with the new and interesting facts, travels, writes, labors day and night for years, finally secures the attention of the Government and Congress, and asks a fair and reasonable compensation for the necessary service which he proposes performing for the public. He has contended with every species of opposition, overcome unwonted embarrassments, foiled the machinations of selfish, interested parties who would through all time mislead the public if they could but continue a monopoly of trade, and finally succeeded in getting a bill through Congress for the establishment of the long-sought line.

This done, he supposes that he is of course to be rewarded for the effort, the toil, and the expenditure of years, and that he will have an opportunity of indemnifying himself for his losses and sacrifices. He hears many beautiful apostrophes to the principles of equal justice and right which are said to characterize the legislation of his country, and control the action of the Government; but he is not prepared to hear that some adventurer has carried off his prize simply because by chance or by concert he has made his bid one thousand or ten thousand dollars lower than the prime projector. He becomes disheartened; finds that the country neither appreciates nor desires honorable effort and enterprise; that it will not reward the citizen in his self-sacrificing attempts to benefit the

country and himself together; and that it will look on with careless indifference while his almost vested, his equitably vested rights, are neglected or stricken down. This is certainly one of the practical and demoralizing effects of the lowest bidder system, which respects no rights, however sacred, simply because based upon a dogma which is technically true. The system of the lowest bidder is technically correct, but practically wrong. It can not be carried out in practice without abandoning equity and honest rights under the plea of technicalities and the action of chances. It is in reality but a species of gambling, a miserable lottery, in which those who are most honest and truthful are invariably sacrificed. It is proper, then that Congress should not only establish the postal routes, but also determine either specifically or proximately the compensation to be paid; or leave this entirely to the discretion and the largest liberty of action of the Post Master General. Responsibility must attach somewhere if justice is obtained. With the lowest bidder system it rests and operates nowhere; and the most important operations of the Government are taken out of the hands of a wise public functionary and the intelligent legislators of the country, and put into a great wheel of fortune, where the proper person has, probably, but one chance in a hundred. This although true in every case of contract, is eminently so in cases of untried lines, where the experiment is to be made, and where it is generally necessary that an individual shall have spent years in bringing it to light.

I come to the conclusion, therefore, that the Government can discharge the clear and unquestionable duty of affording liberal mail facilities to the people, only by establishing all of the

lines which the commerce and convenience of the country and the Government require; by maintaining them as a fixed policy of the country from generation to generation; by encouraging enterprising companies to continue well-performed services, and enterprising citizens to open new avenues of trade and wealth; and by paying for the same from the general treasury of the people, and from the revenues which these postal facilities, more than any other series of influences, conspire to produce and to conserve. (*See Report of Lord Canning, Section IX.: also Report of Gen. Rusk, Paper E: also remarks of Hon. Edwin Croswell, Paper E.*)

SECTION IX.

THE BRITISH SYSTEM, AND ITS RESULTS.

STEAM MAIL SYSTEM INAUGURATED AS THE PROMOTER OF WEALTH, POWER, AND CIVILIZATION: THE EFFECT OF THE SYSTEM ON COMMERCE: THE LONG PERIOD DESIGNATED FOR THE EXPERIMENT: NEW LINES, WHEN, HOW, AND WHY ESTABLISHED: THE WORKINGS OF THE SYSTEM: FIRST CONTRACT MADE IN 1833, LIVERPOOL AND ISLE OF MAN: WITH ROTTERDAM IN 1834: FALMOUTH AND GIBRALTAR, 1837; ABERDEEN, SHETLAND, AND ORKNEYS, 1840: THE "SAVANNAH," THE FIRST OCEAN STEAMER: THE SIRIUS AND GREAT WESTERN: CUNARD CONTRACT MADE IN 1839: EXTRA PAY "WITHIN

CERTAIN LIMITS:" MALTA, ALEXANDRIA, SUEZ, EAST-INDIES, AND CHINA IN 1840: THE PENINSULAR AND ORIENTAL COMPANY: WEST-INDIA SERVICE ESTABLISHED IN 1840: POINTS TOUCHED AT: PROVISIONAL EXTRA PAY: PANAMA AND VALPARAISO LINE ESTABLISHED IN 1845: HOLYHEAD AND KINGSTON IN 1848: ALSO THE CHANNEL ISLANDS: WEST COAST OF AFRICA AND CAPE OF GOOD HOPE IN 1852: CALCUTTA VIA THE CAPE IN 1852, AND ABANDONED: PLYMOUTH, SYDNEY, AND NEW SOUTH WALES ALSO IN 1852, AND ABANDONED: INVESTIGATION OF 1851 AND 1853, AND NEW AUSTRALIAN CONTRACT IN 1856: HALIFAX, NEWFOUNDLAND, BERMUDA, AND ST. THOMAS IN 1850: NEW-YORK AND BERMUDA SOON DISCONTINUED: COMPARISON OF BRITISH AND AMERICAN SUBSIDIES, RATES PER MILE, TOTAL DISTANCES, AND POSTAL INCOME: THE BRITISH GOVERNMENT PAYS HIGHER SUBSIDIES THAN THE AMERICAN: WORKINGS AND INCREASE OF THE BRITISH SERVICE: GEN. RUSK'S VIEWS: SPEECH OF HON. T. B. KING: COMMITTEE OF INVESTIGATION, 1849: NEW INVESTIGATION ORDERED IN 1853, AND INSTRUCTIONS: LORD CANNING'S REPORT AND ITS RECOMMENDATIONS: GREAT BRITAIN WILL NOT ABANDON HER MAIL SYSTEM: THE NEW AUSTRALIAN LINE: TESTIMONY OF ATHERTON AND MURRAY: MANY EXTRACTS FROM THE REPORT: STEAM INDISPENSABLE: NOT SELF-SUPPORTING: THE MAIL RECEIPTS WILL NOT PAY FOR IT: RESULT OF THE WHOLE SYSTEM: ANOTHER NEW SERVICE TO INDIA AND CHINA: SHALL WE RUN THE POSTAL AND COMMERCIAL RACE WITH GREAT BRITAIN? CANADA AND THE

INDIES.

It is admitted that it is the clear and unquestionable duty of the Government to establish ample foreign mail facilities for the nation, and that the only means of accomplishing this is by guaranteeing a liberal allowance for a long term of years for the transport of the mails, and paying for the same from the general treasury of the country. We will, therefore, now examine the British ocean steam mail system, and shall see that the practice of that great nation fully corroborates and sustains the views which have been advanced in the preceding chapters.

The steamship policy of that nation has not been treated as a matter of slight or secondary importance. British statesmen from the earliest days of the development of marine steam power saw the influence which it was likely to exert in the revolutions of commerce and the control of the nations of the world, and determined, with the sagacious foresight and the firm, fixed purpose for which they are distinguished, that it should be at once inaugurated as the great instrument of individual wealth and national power. They properly conceived that the nation which used this transforming agent most freely in commerce, defenses and diplomacy would unquestionably exert a high controlling influence over the nations of the earth, and make every land tributary to its wealth and power. The end justifies the effort, and the few temporary sacrifices and insignificant expenditures which have been made. The British nation launched at once into an extended foreign mail system which has been twenty years maturing and untouched, and which, on a small annual expenditure, has given it the profitable control of every trade and every

market on the face of the globe. It was wisely conceded that a long period would be necessary to make the great experiment of marine steam mails, and that term was granted in the outset. When the first term of twelve years had ended, the contracts were renewed for another term of twelve years, in every instance with the companies first authorized, and the sums of subsidy were in every case increased. Not only thus. New lines were established all along the course of these experiments, in a quiet executive way, without agitation, without lobbying, without corruption, just as the Post Master General would put some short and necessary land route into operation. The last of these lines established was that in 1856, between Southampton and Australia for seven years, at an annual subsidy of £185,000, or $925,000. And this line was established, not because there was no postal communication; for the Government already had a semi-monthly line to China, India, and Australia, and another around Africa; but because the increased demands of British trade, and convenience to the British public, made it necessary.

During all of this time the system has operated with unbroken regularity. Established on a great general principle, as well as the highest possible expediency, it has been regarded as a fixed policy of the Government and the people, and has been suffered to do its excellent work quietly and undisturbed. The legislation introducing it was not an accident. It was not a spasm of generosity to the people; but it was a fixed purpose of the British public; the wise and only adequate means adapted to accomplish an important, an indispensable end. The first contract for carrying the mails in steamers, was made by the Post Master

General in 1833, with the "Mona Isle Steam Company," to run semi-weekly between Liverpool and the Isle of Man at £850 per annum. This Company has run the line ever since, a period of twenty-four years, and at the same price per annum. After this, a contract was made in 1834 with the "General Steam Navigation Company," for the semi-weekly conveyance of the mails between London and Rotterdam, and London and Hamburg, at £17,000 per year. The contract was not annulled until 1853, nineteen years, when it was found best to send the mail by a new route; that is, to Ostend, and over the railways of Belgium. The first contract for a long voyage was made with Richard Bourne, in 1837, to convey the mails weekly from Falmouth to Vigo, O Porto, Lisbon, Cadiz, and Gibraltar, for £29,600 per annum. The contract was transferred in 1843 to the "Peninsular and Oriental Company," Southampton was substituted for Falmouth, the weekly trips were changed to three per month, and the subsidy was reduced accordingly, or to £20,500 per annum. The service has been performed on these terms ever since. The Aberdeen and Shetland contract was made in 1840, at £900 per year, after a failure to run on £600, by a previous arrangement. It now continues as then made.

It is known that the first passage across the Atlantic was made in the American steamer "Savannah," which left Savannah, Georgia, on the 25th May, 1819, and at the end of twenty-two days arrived in Liverpool, steaming only fourteen days of the time. The Savannah was only 350 tons tonnage, and had an engine of ninety horses' power. Captain Moses Rogers was her commander. The "Sirius" arrived in New-York on the 23d of April, 1838. The steamer

"Great Western" next followed, in the same year. And although this was only nineteen years ago, it is instructive to notice the observations which the *London Times* made at that day. That journal said, March 31, 1838:

"There is really no mistake in this long-talked of project of navigating the Atlantic ocean by steam. There is no doubt of the intention to make the attempt, and to give the experiment, as such, a fair trial. The Sirius is actually getting under way for America."

On the 4th of July, 1839, the British Government entered into a contract with Samuel Cunard of Halifax for a semi-monthly mail line between Liverpool, and Halifax, and Boston, at the sum of £60,000 or $300,000 per annum. That contract inaugurated a new era in our American commerce with the old world, and gave an impulse to those international interests and those commercial amities which have bound Great Britain and the United States in the bonds of enduring friendship and mutual, neighborly dependence. Boston soon proved inadequate to the support of the entire line, and half of the steamers were sent to New-York; and thus they continue to run to this day. It is a singular fact that since that contract was made, eighteen years ago, there has never been one transatlantic steamer except those of Mr. Cunard running to or from that port. This contract was renewed with Mr. Cunard in 1850, when weekly trips were required for the greater portion of the year, and the subsidy was advanced, not in the ratio of the service, which was only doubled, but as three to one, from £60,000 to £173,340, or from $300,000 to $866,700. The experience of twelve years had demonstrated both

the necessity of continuing the line, and of increasing the subsidy which the Government paid, to such a sum as would secure good steamers, regularity of trips, and efficiency of service. The Company now has nine steamers, with 18,406 tons aggregate tonnage, and 6,418 horses' power. The contract, which is to continue for twelve years, until 1862, was so altered in 1852 as to provide for a weekly service as well in winter as in summer; and it will continue in force from 1862 until twelve months after notice may be given for the discontinuance of the line. The compensation for the same is at the rate of 11*s* $4^1/_2$*d* per mile. Lord Canning's Report to Parliament in 1853, before noticed, in particularizing on this line, said:

"An additional allowance, *within certain limits*, is to be made to the contractors in the event of an increase in the rate of insurance on steam vessels, or in the freight or insurance of coals, as compared with the rates payable at the date of the contract, if proved to the satisfaction of the Lords Commissioners of the Admiralty."

Thus, instead of abandoning this line after an experiment of twelve years, and finding that it could never be self-supporting, the British Government wisely determined to let their policy produce its full fruits, and continued it for another similar term of years, with three times the former subsidy, for only twice the old service. (*See Collins and Cunard Lines, Sec. X.*)

A contract was made in 1840 for steam to Malta, Corfu, and Alexandria, and the service was extended in 1845 to Suez, Bombáy, Ceylón, Calcutta, Hong Kong, and Shanghae. It was renewed again in 1853,

terminable in 1862, or after twelve months' notice, with a service between Sydney and Singapore, with the "Peninsular and Oriental Company;" and the subsidy for the whole service was increased from £199,600 or $998,000 per annum, to $1,224,000 per annum. The Company have thirty-nine vessels of 48,835 tons, and 12,850 horses' power, and run 796,637 annually, at 6*s* $1^{3}/_{4}d$ per mile. The steamers run the whole service of 796,637 miles annually, at this low rate because much of the service is confined to the Mediterranean, as for example, their line from Southampton to Vigo, O Porto, Lisbon, Cadiz, and Gibraltar; and also that between Marseilles and Malta. This is but like the coasting trade at the utmost, and is not ocean navigation proper. Before the contract was renewed the same company got for the service between Hong Kong and Ceylon, 12*s* 7*d* per mile, and for that between Suez and Calcutta, £1, 0*s* $1^{1}/_{2}d$ per mile.

The contract with the "West-India Royal Mail Packet Company" was made in 1840 for a semi-monthly service to the West-Indies, Central America, and Mexico, at £240,000, and for 547,296 nautical miles per annum. The contract was renewed on the same terms in 1846, and again in 1850, when the Brazil service was added, and the subsidy increased to £270,000 or $1,350,000 per annum, for twelve years, or until 1862, and one year after notice shall have been given. The length of the routes now run by the Company is 37,000 nautical miles, with thirty-four stopping places. The West-India service of 393,432 miles, is performed at the rate of 10*s* $10^{1}/_{2}d$ per mile, under special contract; no advertisement ever having been made for tenders. The Brazilian portion of the service embraces 153,864 miles

annually. Pay per mile for the whole Royal Mail service is 9*s* 10*d* per mile. This Company has twenty steamers, of 29,454 tons, and 9,308 horses' power. On the Brazil portion of the service the touches are at Lisbon, Madeira, Teneriffe, St. Vincent, Pernambuco, Bahia, Rio de Janiero, Monte Video, and Buenos Ayres. On the West-India division, St. Thomas is the central dépôt, after touching at the Azores. Ten branch lines radiate from St. Thomas to Antigua, Barbados, Blewfields, Carriacou, Carthagena, Aspinwall, (which they call Colon,) Demarára, Dominíca, Grenáda, Greytown, Gaudaloupe, Havanna, Honduras, Jacmel, Jamaica, Martinique, Porto Rico, St. Kitt's, St. Lucia, St. Vincent, Santa Martha, Tampíco, Tobago, Trinidad, and Vera Cruz. Lord Canning says:

"It is stipulated that if at any time, from causes recognized by the Lords of the Treasury as being of a 'distinctly public and national character,' the insurance on steam vessels shall rise above 6*l* 6*s* per cent., the freight of coals above 1*l* 2*s* 6*d* per ton, and the insurance on coals above 2*l* 2*s* per cent., the Company shall receive an additional sum, to be settled by arbitration, but not to exceed 75,000*l* a year in the whole."

The special contract for the West Coast of South-America, with the "Pacific Steam Navigation Company," for three round trips per month between Panama and Valparaiso, touching at Buenaventura, Guayaquil, Payta, Lambayeque, Huanchaco, Santa, Pisco, Islay, Aríca, Iquique, Cobija, Copiápo, Huasco, and Coquimbo, was made in 1845, at £20,000, or $100,000 per annum, for five years. It was renewed in 1850 for ten years; and hence, expires in 1860, if notice may be given to that effect; the trips being

only semi-monthly, and the subsidy increased to £25,000 per annum. The Company has seven steamers, of 5,719 tons, and 2,396 horses' power. (*See List of British Mail Lines, Paper B, page 193.*)

The contract for running fast packets between Holyhead and Kingston, in Ireland, was made in 1848 with the "City of Dublin Steam Packet Company," for £25,000 per annum, and is terminable at twelve months' notice after 1860. The line is run twice every day. The service to the Channel islands, from Southampton to Jersey and Guernsey, was established in 1848, at £4,000 per annum, for three trips per week. That of the West Coast of Africa was established in 1852, at £21,250 per annum. Leaving Plymouth, the steamers touch at Madeira, Teneriffe, Goree, Bathurst, Sierra Leone, Monrovia, Cape Coast Castle, Accra, Whydah, Badagry, Lagos, Bonny, Old Calabár, Cameroon, and Fernando Po. This contract was made with the "African Steamship Company," for a monthly service, and terminates in 1862 if twelve months' notice be given. There must be three steamers of 700 tons each, and the pay is, for 149,880 miles annually, at 2*s* 6*d* per mile. The contract with the "General Screw Steamshipping Company," for service semi-monthly from Plymouth to the Cape of Good Hope and Calcutta, touching on the return voyage at St. Vincent, Ascension, Cape of Good Hope, Mauritius, Point de Galle, Madrás, and St. Hélena, for £50,000 per year, to be reduced after two years to £40,000 annually, and that to the Cape of Good Hope and Port Natál, touching at Mossel and Algoa bays, Buffalo, and Port Francis, for £3,000 per annum, with the same Company, were both made in 1852; but the service was found impracticable on the terms, and was abandoned. That from Plymouth

every two months to Sydney and New South Wales, with the "Australian Royal Mail Steam Navigation Co.," for £26,000 per annum, and touching at St. Vincent, Simon's Bay, or Table Bay, Cape of Good Hope, King George Sound, Port Philip, and St. Hélena, was made also in 1852; but was likewise soon abandoned, as the subsidy in each case was too small.

About this time the Chancellor of the Exchequer requested a thorough investigation into the foreign steam packet system. This was made in the most searching manner in 1853; and such was the effect that it was determined not only to sustain all of the existing lines in all of their integrity, but to extend the system and afford additional facilities to British commerce and the British people. Accordingly, a new contract was made last year, 1856, with the "European and Australian Mail Steam Packet Company" for a monthly service between Southampton, Marseilles, Malta, Alexandria, Suez, and Sydney, at an annual subsidy of £185,000, or $925,000. The Company has seven steamers of 13,410 tons, and 3,290 horses' power. They run 336,000 miles per annum, and receive 11*s* per mile from the Government. It must be borne in mind, too, that when this line was established there were already two lines to the East-Indies and China, and one to Australia. This makes two to Australia, and three to the East generally.

There is also a contract, made in 1850 with Mr. Cunard, for running monthly between Halifax and Newfoundland, and Halifax, Bermuda, and New-York, as well as between New-York and Bermuda and St. Thomas. New-York was soon dropped from the list, doubtless because the British steamers

yielded us more advantage than was gained by the mother country or the Provinces, and the line is now continued, at the original compensation, £14,700, or $73,500, between Halifax and Newfoundland, and Halifax, Bermuda, and St. Thomas, connecting with the Cunard steamers. The steamers are small coasters, and run at the rate of 3*s* per mile. Hence, they make 98,000 miles per annum.

The ocean mail steamers of Great Britain run 2,532,231 miles per year, at a total cost to the Admiralty of £1,062,797, or $5,333,985. The ocean mail steamers of the United States run 735,732 miles per year, at a total charge on the Post Office Department of $1,329,733. The British steamers run three and a half times as many miles as ours do, and receive for it a sum more than four times as large. The average price paid to their principal companies, as the West-India Royal Mail, the Cunard, the Australian, and the Peninsular and Oriental, including its Mediterranean coasting service, is 9*s* 7*d*, or $2.39 per mile; while the average price paid by us, or for the Collins, Havre, Bremen, Aspinwall, and Panamá, San Francisco and Oregon, is 1.80^{3}/_{4}$ per mile. The highest sum paid per mile by the British Government is 11*s* 4$^{1}/_{4}$*d*, or 2.83^{1}/_{2}$, to the Cunard Company, $2.75 to the Australian, and $2.46 to the West-India; and the lowest, 6*s* 1$^{3}/_{4}$*d*, or 1.53^{1}/_{2}$ to the Peninsular and Oriental, much of whose service is coasting. This is saying nothing of the Pacific and the African coasting lines. The highest sum which we pay is to the Collins line, 3.10^{1}/_{2}$ per mile; and the lowest to the Havre, 1.00^{1}/_{2}$ per mile; while the sums paid to all of the other companies range but little above the last figures. The lowest rate per mile paid to any of the lines under the contract, was to

the Pacific Mail, $1.70. It must not be forgotten that the low rates per mile of the Havre and Bremen result from those lines taking the postages, since their contracts expired; a sum by no means adjusted to the service done. They had ships that they could not let lie idle. Under their regular contracts the pay per mile of the Bremen line was $2.08, and of the Havre 1.76^{1}/_{2}$. While the British Government pays to four of her principal transmarine services an average of $2.39 per mile, we pay to five of ours an average of 1.80^{3}/_{4}$ only, or but about two thirds as much as she does. While our total annual expenditure for foreign mails is $1,329,733, a sum by $20,267 less than that paid to the single service of the West-India Royal Mail Company, that of Great Britain is $5,333,985. And, while our total income from transmarine postages is $1,035,740, a sum but little short of that paid in subsidy, taking the present Bremen and Havre services at the estimates of last year for sea and inland postages combined, the income from the whole transmarine service of Great Britain, including ocean and inland postage, was, when the last report was made in 1853, £591,573, or $2,957,865; but little above half the sum paid in subsidy, and including the French, Belgian, and Dutch routes, where the postal yield was much greater than from the ocean lines. The estimates which I present below have been made with great care from distances and subsidies furnished me by the reliable First Assistant Post Master General, Hon. Horatio King, from the last report of the late Post Master General, and from the report of the British Post Master General, Lord Canning, before noticed. Every item is consequently authentic.

AMERICAN.

Line.	Trips.	Distances.	Subsidy.	Gross Postage.
Collins,	20	3,100	$385,000	$415,867
Bremen,	13	3,700	128,987	128,937
Havre,	13	3,270	88,484	88,484
Aspinwall,	24	3,200	290,000	139,610
Pacific,	24	4,200	348,250	183,238
Havana,	24	669	60,000	6,288
Vera Cruz,	24	900	29,062	5,960
			$1,329,733	$1,035,740

Total average per mile, 1.80^{3}/_{4}$. Average of five principal lines, 1.80^{3}/_{4}$.

BRITISH.

Line.	Trips.	Distances.	Subsidy.	Gross Post
Cunard,	52	3,100	£173,340	£143,667
Royal Mail,	24	11,402	270,000	106,905.
Pen. and Oriental,	24	[F]	244,000	178,186.
Australian,	12	14,000	185,000	33,281.
Bermúda and St. Thomas,	24	2,042	14,700	
Panamá and Valparaiso,	24	2,718	25,000	5,715.0

West Coast Africa,	12	6,245	23,250	3,196.0 French, Bel and Dut Postage
Channel Islands,	156	132		74,4
Holyhead and Kingston,	730	64		36,1
Liv. and Isle of Man,	112	70		10,0
Shetland and Orkneys,	52	200		20,80
			£1,062,797	£591,573

Total Average per Mile, 2.10^{1}/_{3}$. Average of four principal lines, $2.39.

> [F] The Peninsular and Oriental Company run twice per month between Southampton and Alexandria, and between Suez and Calcutta and Hong Kong; twice per month between Marseilles and Malta; between Singapore and Sydney every two months; and three times per month between Southampton and Gibraltar, touching at Vigo, O Porto, Lisbon, and Cadiz.

It would hardly be expected that the lines of this country should run at cheaper rates than those of Great Britain, as the prime cost of ships and their repairs, fuel, wages, insurance, etc., are much cheaper there, and as they have more paying freights, in their manufactured goods. It only explains to us, what has alway seemed a mystery;

that while the regular companies in England were making money, nearly all of those in the United States not only had not made money, but were embarrassed more or less, and were selling their stocks at sixty to eighty cents on the dollar.

It is pleasing and instructive to examine the steam mail service of Great Britain, and see the gradual, unfaltering progress that she has made from year to year, since 1833; increasing the mail facilities and the sums paid for them by constant accretion based on system, rather than by any spasmodic legislation, or the ruling caprices of the moment. These improvements have not come all in a mass, or in any one year. Neither have they been abandoned at times of financial embarrassment, or commercial depression. At such periods they have been as regularly fostered as in the times of the most flush prosperity; and have ever been properly considered one of the prime agents and necessities for restoring commerce to its normal condition and a safe equilibrium. The transmarine service, which cost but £583,793, or $2,918,965, per annum until 1850,[G] now costs £1,062,797, or $5,333,985; within a fraction of double the sum. While the increase has not been slow, it has been steady and systematic, just as it was necessary to meet the wants of British commerce throughout the world. The language of the Hon. Senator Rusk on this subject, in his Report made to the Senate, Sep. 18th, 1850, found in Senate Ex. Doc. No. 50, 1st Session of 32d Congress, in Special Rep. Secretary of the Navy, 1852, is forcible and worthy of remembrance. He says:

[G] See Second Report, Steam Communication with India, 1851. Appendix, page 419.

"The importance of the steam mail service, when considered with reference to the convenience which it affords to the social intercourse of the country, is as nothing when compared with its vast bearing upon the commerce of the world. Wherever facilities of rapid travel exist, trade will be found with its attendant wealth. Of the truth of this proposition, no country, perhaps, affords a more forcible illustration than Great Britain, as none has ever availed itself, to so great an extent, of the benefits of easy and rapid intercommunication between the various portions of her almost boundless empire. The commercial history of England has shown that mail facilities have uniformly gone hand in hand with the extension of trade; and wherever British subjects are found forming communities, there do we find the hand of the government busy in supplying the means of easy and safe communication with the mother country. With a view to this, we have beheld England increasing her steam marine at an enormous expense, and sustaining packet lines connecting with every quarter of the globe, even in cases where any *immediate* and *direct* remuneration was out of the question. The great object in view was, to draw together the portions of an empire upon which the sun never sets, and the martial airs of which encircle the globe, and to make British subjects who dwell in Europe, Asia, Africa, America, and even Oceanica, all feel alike that they are Britons."

The Hon. Thomas Butler King, formerly Chairman of the Naval Committee, in a speech in the House, 19th July, 1848, said on this subject:

> "In the year 1840 a contract was made by the Admiralty with the Royal Mail Steam Packet Company, at two hundred and forty thousand pounds sterling, or one million two hundred thousand dollars per annum, for fourteen steamers to carry the mails from Southampton to the West-Indies, the ports of Mexico in the Gulf, and to New-Orleans, Mobile, Savannah, and Charleston. These ships are of the largest class, and are to conform in all respects, concerning size and adaptation to the purposes of war, to the conditions prescribed in the Cunard contracts. They are to make twenty-four voyages or forty-eight trips a year, leaving and returning to Southampton semi-monthly.
>
> "Another contract has recently been entered into, as I am informed, for two ships to run between Bermuda and New-York. The West-India line, in consequence of some disasters during the first years of its service, was relieved from touching at the ports of the United States; but in the spring of last year it was required to resume its communication with New-Orleans, and is at any time liable to be required to touch at the other ports on our coast which I have named. Thus it will be perceived that this system of mail steam-packet service is so arranged as not only to communicate with Canada and the West-Indies, the ports on the Spanish Main and the Gulf coast of Mexico, but also to touch at

> every important port in the United States, from Boston to New-Orleans.
>
> "These three lines employ twenty-five steamers of the largest and most efficient description, where familiarity with our seaports and the whole extent of our coast would render them the most formidable enemies in time of war. It is scarcely possible to imagine a system more skillfully devised to bring down upon us, at any given point, and at any unexpected moment, the whole force of British power. More especially is this true with respect to our *southern* coast, where the great number of accessible and unprotected harbors, both on the Atlantic and the Gulf, would render such incursions comparatively safe to them, and terrible to us. And when we reflect that the design of this system is, that it shall draw the means of its support from our own commerce and intercourse, we should surely have been wanting in the duty we owed to ourselves and to our country, if we had failed to adopt measures towards the establishment of such an American system of Atlantic steam navigation as would compete successfully with it."

Previous to the renewal of the several foreign mail contracts, in 1850, the Treasury ordered, 26th April, 1849, the formation of a Committee in these words: "*Ordered*, that a Select Committee be appointed to inquire into the CONTRACT PACKET SERVICE." That Committee was composed of Sir James Hogg, Mr. Cardwell, Sir Wm. Clay, Mr. Cowper, Mr. Alderman Thompson, Mr. Fitz Roy, Mr. Hastie, Mr. Mangles,

Mr. Thomas Baring, Mr. Bankes, Mr. William Brown, Mr. Childers, Mr. Wilcox, Mr. Crogan, and Mr. Henley. Mr. Elliot was added in the place of Mr. Baring. The Committee sat seventeen days, and examined fifteen witnesses under oath, many of these being commanders in the Navy, Secretaries, Presidents, and engineers of the Companies, and other eminent men in steam. Mr. Cunard was among the witnesses. After taking evidence and papers extending over about seven hundred and eighty-three octavo pages, they said in their report, after recommending that great care should be exercised in making all future contracts:

"1. That so far as the Committee are able to judge, from the evidence they have taken, it appears that the mails are conveyed at a less cost by Hired Packets than by Her Majesty's Vessels.

"2. That some of the existing Contracts have been put up to public tender, and some arranged by private negotiation; and that a very large sum beyond what is received from postage is paid on some of the lines; but considering that at the time these contracts were arranged the success of these large undertakings was uncertain, Your Committee see no reason to think that better terms could have been obtained for the public."

This investigation was made to enable the Government to proceed intelligently with the many contracts which were to expire in 1850; and its immediate consequence was, not only the renewal of all the old contracts with the same parties at the same or larger pay, but the establishment of several new services.

The British system had operated to the very highest satisfaction of the public and the Government for twenty years, until 1853, as it has done ever since; but at that time it was put to a second and very severe test. It had been suggested, probably by the Lords of the Admiralty, who had to pay the bills from the Naval fund, that the packet system was too costly, and should be remodelled, and perhaps reduced. Complaint was thus made to the Chancellor of the Exchequer, who, in a Treasury Minute, dated March 1, 1853, says:

> "Important as it is to secure rapid and certain communication with the remote dependencies of this country, and with other distant states, for national purposes, it is doubtless, under all common circumstances, from commercial considerations that such facility of correspondence derives its highest value."
>
> "Her Majesty's Government conceive the time to have arrived when the entire charge of the packet service should be deliberately examined and reviewed, with joint reference to the questions—how far the purposes with which the present system was begun have been accomplished—how far the total amount of service rendered to the State is adequate to the total annual expense—how far there may be cause for a more than commonly jealous and scrupulous consideration of such further schemes of extension of the system as particular interests or parties may press, or even such as public objects may recommend from time to time; lastly, how far, on account of the early

> period at which certain of the contracts are terminable, or on account of requisitions put in by the contractors themselves for the modification of the terms, or for any other reason, it may be prudent to entertain the question of any revision of those terms, or of laying down any prospective rules with regard to them; such only, of course, as may comport with the equitable as well as the legal rights of the parties, and may avoid any disappointment to the just expectations of those classes who may have felt a peculiar interest in the establishment and extension of these great lines of communication."

After remarking that some of the vessels of some few Companies were unfit for purposes of war, the "Minute of the Treasury," in instructing the Committee, further says:

> "At the same time, it is not to be conceived that, on account of this failure in a portion of the design, the country has cause to regret having paid a larger price than was intended to be paid simply for the establishment of these noble chains of communication, which well nigh embrace the world. The organization of a complete postal system upon the ocean, with absolute fixity of departures, and a general approach to certainty in arrivals, was a great problem, of high interest and benefit, not to England only, but to all civilized countries; and this problem may now be said to have been solved by England, for the advantage of mankind at large. It was to all appearance altogether beyond the reach of merely

> commercial enterprise; and if the price paid has been high, the object has been worthy, and the success for all essential purposes complete."

As a consequence of this "Minute," the Lords Commissioners of Her Majesty's Treasury appointed a Committee, consisting of Viscount Canning, Post Master General of Great Britain, as President; Hon. Wm. Cowper, on behalf of the Board of Admiralty; Sir Stafford H. Northcote, Bart.; and Mr. R. Madox Bromley, Secretary to the Board of Audit. The Committee organized, examined the Evidence and Report of the Committee of 1849, also the three large volumes of Evidence and Report taken by the Committee in 1851 on "Steam Communication with India and Australia," and the many elaborate documents of this class published by the Admiralty. After discussing thoroughly all of the political, financial, commercial, ethical, and social questions connected with rapid steam mail communication, they made an elaborate and detailed examination of all the contracts existing with the Government, and of the affairs of the various companies, with a view to deciding whether the ocean mail service should be abridged, or continued, or extended. They reported to both Houses of Parliament, July 8th, 1853. The conclusion of the Committee was, not only that the present service was demanded by every interest of the country and should be sustained, but that it should be judiciously extended, so as to meet all of the wants of the British public of whatever class. As elsewhere remarked, the new line established last year to Australia and India, at a cost of $925,000 per annum, for seven years, was a legitimate result of that test and that report, made in the most searching

manner by the very ablest men of the kingdom; and this, notwithstanding the reports purposely circulated in this country every few years that Great Britain intends abandoning her steam mail system. She will abandon that system, as her practice plainly indicates, only when her people shall have discovered some means of making and preserving wealth without effort, enterprise, commerce, or manufactures. (*See page 99, Mr. Atherton's Reply.*) The Report says:

> "Before the application of steam to the propulsion of ships, the contracts were often made for short periods, the Government being able to find, among the vessels already employed in trade, some of speed sufficient for the purpose; but when it became requisite to dispatch the mails by steam, the ordinary supply of trading vessels would no longer suffice, and the Government had to call into existence a new class of packets.
>
> "The postal service between England and the adjacent shores of Ireland, France, and Belgium, was at first performed by steam packets belonging to the Crown; but for the longer voyages it was thought better to induce commercial companies to build steamers; and with that view the contracts were at first made for periods which, unless previously terminated by failure to fulfill their engagements, would secure to the company the full benefit of their original outlay, by continuing the employment of their vessels until they might be expected to require extensive repairs, or to become unfit for continued service. In 1837 steam

communication was created with Portugal and Gibraltar; in 1840 with Egypt, with the West-Indies, and with North-America.

"When the public interest requires the establishment of a postal line on which the ordinary traffic would not be remunerative for steamers, the subsidy to be allowed in the contract may be ascertained either by the test of public competition, or by calculating the amount which, on an estimate of the probable receipts and expenditure, will cover the deficiency of receipts, or by comparing it with the cost of war vessels if employed for the same purpose."

"The objects which appear to have led to the formation of these contracts, and to the large expenditure involved, were—to afford a rapid, frequent, and punctual communication with those distant ports which feed the main arteries of British commerce, and with the most important of our foreign possessions; to foster maritime enterprise; and to encourage the production of a superior class of vessels which would promote the convenience and wealth of the country in time of peace, and assist in defending its shores against hostile aggression.

"These expectations have not been disappointed. The ocean has been traversed with a precision and regularity hitherto deemed impossible—commerce and civilization have been extended—the colonies have been brought more closely into connection with the Home Government—and

> steamships have been constructed of a size and power that, without Government aid, could hardly, at least for many years, have been produced.
>
> "It is not easy to estimate the pecuniary value of these results, but there is no reason to suppose that they could have been attained at that time at less cost."

After noticing the objects of the postal contracts, the Report says, in speaking of their results:

> "To show what the system is capable of accomplishing, it will be sufficient that we should call attention to the two great lines of communication which have been opened, the one between this country and India, the other between this country and America. The mails are dispatched twice a month in the one case, and once a week in the other, and are conveyed to their destination with a regularity and rapidity which leaves nothing to be desired. The time occupied in the voyage to and fro between England and Bombay, which, before the establishment of the Overland Route, averaged about 224 days, is now no more than 87 days; and the time occupied in the voyage to and fro between England and the United States, which before 1840 varied from 45 to 105 days, is now reduced to an average period of 24 days. Nor is the service simply rapid, it is also regular; and the mercantile community can reckon with the utmost certainty on the punctual departure of the mails at the

> appointed times, and can also calculate with great precision the times of their arrival.
>
> "The same results have not been so conspicuous on some other postal lines; but, taking the service as a whole, it has undoubtedly been brought to a high state of excellence, and its value to the country, both politically and commercially, is very considerable."

In speaking further of the objects of the Government postal service, after inquiring whether the foreign mail service should be extended any further, it says:

> "The object of the Government in undertaking the transmarine postal service, whether by packets or by the system of ship letters, is to provide frequent, rapid, and regular communication between this country and other states, and between different parts of the British Empire. The reasons for desiring such communication are partly commercial and partly political. In cases where the interests concerned are chiefly those of commerce, it is generally more important that the postal service should be regular, than that it should be extremely rapid, though of course rapidity of communication, where it can be obtained without sacrificing other objects, is of great advantage. It would clearly be the interest of persons engaged in an important trade, provided there were no legal impediment in the way, to establish a regular postal communication in connection with it, even without aid from the state. This, however,

would not extend to many cases in which there are political reasons for maintaining such services, while the commercial interests involved are of less magnitude. *Nor is it probable that private communications would be nearly so rapid as those directed by the Government; for a high rate of speed can only be obtained at a great expense, which will generally be found to be disproportionate to the benefits directly received from it, unless under peculiar circumstances of passenger traffic.* Lastly, it is to be considered that there are several services which, if they were not carried on by the British Government, would probably be undertaken by the Governments of foreign states, and that it is not likely that private individuals or associations would in such cases enter into competition with them.

"From these considerations we infer that, even upon the lines in the maintenance of which the greatest commercial interests are involved, private enterprise can not be depended upon for providing a complete substitute for Government agency; while it is clear that in others, where regular communications are desired solely or chiefly for political purposes, such agency is absolutely indispensable. *It is, however, obvious, that to establish a Government system in some cases, and to leave others wholly to private persons, would cause much inconvenience.* The conclusion therefore follows, that it is right that the Government should have the management of the whole of the transmarine postal communication, as it

also has that of the communication within the country.

"In undertaking this duty, the Government will in the first place have regard to the national interests, whether political, social, or commercial, involved in the establishment and maintenance of each particular line. Care must, however, be taken, in cases where the communication is desired chiefly for commercial purposes, to guard against an undue expenditure of public money for the benefit of private merchants. The extension of commerce is undoubtedly a national advantage, and it is quite reasonable that Parliamentary grants should occasionally be employed for the sake of affording fresh openings for it, by establishing new lines of communication, or introducing new methods of conveyance, the expense of which, after the first outlay has been incurred, may be expected to be borne by the parties availing themselves of the facilities offered them. But this having once been done, and sufficient time having been allowed for the experiment, the further continuance of the service, unless required for political reasons of adequate importance, should be made to depend upon the extent to which the parties chiefly interested avail themselves of it, and upon its tendency to become self-supporting."

Noticing the greater or less sums at which private companies may be induced to undertake short line postal service, and stating that the line is both benefited and injured by the necessity of punctual

sailing hours, the Report states the reason why subsidies are required, thus:

> "The vessels now under contract with the Government are, however, for the most part, required to maintain high rates of speed. The contractors are also subject to a variety of conditions, designed partly to secure the efficiency of the postal service, and partly to render their vessels available for other national purposes wholly unconnected with that service. In return, they are in the receipt of subsidies largely in excess of the amount of revenue derived from the mails they carry, and those subsidies are guaranteed to them for terms of years varying from four to twelve, most of which have at the present time not less than seven or eight years to run. An Estimate printed in the Appendix, will show that while the amount of the subsidies to foreign and colonial lines, as contracted for in the past year, was no less than £822,390, the sums received for postage upon these lines can not be estimated at more than £443,782."

The Report further says, as to the mode by which postal communication can be procured, "where frequent and rapid communication already exists, it is only necessary for the Government to secure from time to time the services of vessels already engaged in private traffic." But as there are no such cases in the transmarine routes, and as private enterprise supplies the demand of steam lines only on the short routes, like the inter-island service of Great Britain, or that to the Continent, or the service of the Sound, the North River, short coast routes, etc., in the

United States, the Report goes on to say:

> "There still remain, however, some cases in which there exists no private communication sufficient to render such a mode of proceeding practicable. Where this is so, and where a communication has to be created, it will be necessary that contracts of longer duration should be made, *for it is unreasonable to expect that any person or association of persons should incur the expense and risk of building vessels, forming costly establishments, and opening a new line of communication at a heavy outlay of capital, without some security that they will be allowed to continue the service long enough to reap some benefit from their undertaking. It must be borne in mind, that the expensive vessels built for the conveyance of the mails at a high rate of speed are not in demand for the purposes of ordinary traffic, and can not therefore be withdrawn and applied to another service at short notice*. It is, then, fair, that on the first opening of a new line, contracts should be made for such a length of time as may encourage the building of ships for the purpose, by affording a prospect of their employment for a considerable number of years. But we see no sufficient reason for continually renewing such contracts for periods equally long, after the object has once been attained."

(*For the views of the Committee on the adaptation of the mail packets to naval service, see* *pages 146* and *147*.)

The Committee in summing up, presents the result of the investigation and the fruits of the service in the

following impressive light:

> "The value of the services thus rendered to the State can not, we think, be measured by a mere reference to the amount of the postal revenue, or even by the commercial advantages accruing from it. It is undoubtedly startling, at first sight, to perceive that the immediate pecuniary result of the Packet System is a loss to the Revenue of about £325,000 a year; but, although this circumstance shows the necessity for a careful revision of the service, and although we believe that much may be done to make that service self-supporting, we do not consider that the money thus expended is to be regarded, even from a fiscal point of view, as a national loss."

It has never been a favorite idea with British statesmen that the packet service should be self-sustaining; nor have they had any evidence to believe that steam companies could live on the postal receipts. It is evident from the following that the packet system is sustained without any reference whatever to the postal income, and for commercial, political, and social purposes alone; only using the income so far as it goes as a part of the contributions by the people to the general treasury. It says:

> "Your Lordships have seen from our Report that in framing these contracts various objects have entered into the consideration of the Government, the cost of which ought not in our opinion to be charged upon the revenues of the General Post Office. A simple comparison of the receipts and expenditure

> upon some of the lines is in itself sufficient to prove this. If the Post Office is to be considered as a department producing revenue, it is not to be supposed that a line of vessels which costs the State £240,000 a year, and brings in no more than £56,002, (as is the case with the West-Indian packets,) or one for which £25,000 is annually paid, and which returns little more than one fifth of that sum, (as the Pacific line,) can be maintained as a part of its machinery; and, in fact, the contracts for many of the services have been made without reference to any estimate or opinion on the part of the Post Master General of their probable value as postal lines."

It thus becomes abundantly evident from the Reports of Parliamentary Committees, from the "Acts of Parliament," and from the practice of the Admiralty and Post Office Departments, as well as from the unvarying experiences of twenty-four years, that the steam mail packet system of Great Britain was primarily adopted, and ever since sustained as the choicest means of giving to that nation the irresistible control of the world. Watching this system from the germ to its present maturity, we have seen the overshadowing tree reach higher and higher, and the circle of each year's growth expand more and more, until the outer ring now embraces the whole civilized and savage world. An additional evidence of this arrives this very day. The Atlantic brings intelligence (*New-York papers, Nov. 22d*) that Great Britain has just completed another mail contract, by which the Peninsular and Oriental Company are to run a third semi-monthly service to

India and China; so that the Government and people of Great Britain shall have a weekly communication with those regions, while we have none except through them, although we are many thousand miles nearer to those countries.

It has been said that we should not attempt to run the postal and commercial race with Great Britain. Why not? Because she has many colonies, and must needs keep up communication with them. And why have steam instead of sail to them? Because steam is the means of more readily *controlling* them. Grant it; and for the very same reason we wish steam with all the world; not that we may control the world, for this is costly and unremunerative, as Great Britain finds; but to conform it, and especially to *control* its commerce. Great Britain has possessions in the West-Indies; but they are of the most insignificant importance when compared with the trade of the many islands and countries near them, which she does not possess, and with the Central American, Californian, Mexican, Peruvian, Chilian, New-Granadian, Venezuelan, and Spanish markets, which she controls and uses. So with India and the Mauritius. It is a matter of sore satisfaction that she is compelled to govern them as a means of reaching their rich trade, which, however rich, is far less important than that of China for which she so strives. So also with Canada. She was told some years since that, if she wished to secede from the Kingdom, because the Government would not assist in building a certain railroad, she might go, and carry peace, also, with her. The Government would scout the idea of running the Cunard line to Canada alone, and would not touch even at Halifax, except that the ships are compelled to go in sight of the place; as the

"great circle" on which they sail nearly cuts the city. Great Britain runs that line because her trade with the United States requires it. That trade is worth to her every year twenty of her Canadas, as that of the West-Indies is worth a dozen of all the possessions which she has there. As to running the race of commerce with her, it is simply a *sine qua non*, on which there is no difference of opinion among Americans who love their country.

SECTION X.

THE MAIL LINES OF THE UNITED STATES.

THE MAIL LINES OF THE UNITED STATES: THE HAVRE AND BREMEN, THE PIONEERS: THE BREMEN SERVICE RECENTLY GIVEN TO MR. VANDERBILT: BOTH LINES RUN ON THE GROSS RECEIPTS: THE CALIFORNIA LINES: WONDROUS DEVELOPMENT OF OUR PACIFIC POSSESSIONS: THE PACIFIC MAIL STEAMSHIP COMPANY: ITS HISTORY, SERVICES, LARGE MATERIEL, AND USEFULNESS: THE UNITED STATES MAIL STEAMSHIP COMPANY: ITS RAMIFIED AND LARGE EXTRA SERVICE: EFFECT UPON THE COMMERCE OF THE GULF: ITS HEAVY LOSSES, AND NEW SHIPS: STEAMSHIP STOCKS GENERALLY AVOIDED: CONSTANTLY FAR BELOW PAR: THE COLLINS LINE: A COMPARISON WITH THE CUNARD: ITS SOURCES OF HEAVY OUTLAY, AND ITS ENTERPRISE: THE AMERICAN MARINE DISASTERS COULD NOT HAVE BEEN PREVENTED BY HUMAN

FORESIGHT: THE VANDERBILT BREMEN LINE.

It is not my intention to notice the various lines in detail, or in any wise become their apologist, eulogist, or prosecutor. As a general thing they have discharged their obligations to the Government and the people in the most creditable manner; in a much better manner than could have been expected of them, considering the novelty of such enterprises in this country and our total want of experience either in steamship building or ocean steam navigation. It is a cause of great gratulation and satisfaction that springing into the great arena of the mail and passenger strife at a single bound, our steamers at once took the lead in the race, and have ever since distanced those of the whole world in speed, comfort, general accommodations, and cheap transit. This may be asserted as a rule without a single exception. The Collins steamers and the steamer "Vanderbilt" have beaten the Cunarders by nearly a day and a half on the average voyages; the Havre and Bremen steamers make just the same time as the Cunarders; and the California steamers of both lines have signally beaten those of all the English lines in the West-Indies, the Mediterranean, and the Pacific and Indian oceans. Indeed the triumphs of our steamers generally and specially have been so decided in every valuable point that we have great reason to be proud of the attainments to which the legislation of 1846 and '47 led. We have nothing to record to the credit of our legislation since that period.

The Havre and Bremen services were the first established in the United States; and as the pioneers in our mail steamshipping they have both proven themselves valuable to the country. The Bremen line

went into the hands of Mr. Vanderbilt during the present year, on the expiration of the old contract; the "Ocean Steam Navigation Company" being unwilling to attempt the performance of the service on the small mail pay of the gross ocean and inland postages, even with their old ships. Mr. Vanderbilt having three ships wholly out of employment, determined to try the service. How far it will prove remunerative we shall not be able to determine until the steamers shall have run through one or two winters as well as summers.

The Havre service was continued in the old hands. Mr. Livingston had two fine new ships, which had been running but little over one year, and which, adapted specially to the mail, passenger, and transport trade of France, could not easily be withdrawn from the business for which they were built; while it would have been quite impossible to find for them employment in any other trade. He, consequently, made a temporary arrangement with the Department for one year, agreeing to transport the mails, as during the old contract, for the gross ocean and inland postages. With this small remuneration the Havre line gets a smaller pay than any other running; but one dollar per mile. The Company have deserved well of the Government for their untiring efforts to perform their contract; one of the greatest sacrifices being the necessity of building two costly new steamers just as their contract was about to expire. They suffered most severely from disaster. Both of their fine and fast steamers, the "Franklin" and the "Humboldt," were lost; and they were compelled to supply their places by chartering at exorbitantly high prices, until they built the two excellent vessels now running, the "Arago" and

"Fulton." These two steamers run probably more cheaply than any ever built in any country; otherwise, being as large as they are, about twenty-six hundred tons each, they could by no means live on the small mail pay now given them. It may be that both these and the Vanderbilt Bremen steamers are losing money; although the latter vessels are much smaller, and have the advantage of an immense emigrant trade. I have no means of knowing the position of affairs in either company.

But no loss to the Havre Company has ever been so great as that of its late President, Mr. Mortimer Livingston. An honorable and just man in his dealings, both with individuals and the Government, he eschewed every attempt by which some sought to pervert and deprave the legislation of the country, and presented all of his views in steamshipping on high, honorable, and tenable grounds. He pursued the profession in an enlarged spirit of enterprise, and was not unmindful of his duties to his country, while he endeavored to establish legitimate trade and preserve a profitable private business which had been well founded long before the introduction of ocean steam. He was a worthy and most honorable gentleman, and is a loss to the whole public.

Prominent among the steamship enterprises of the country stand the two lines which connect the Atlantic and Gulf seaboard with our large and rich possessions in the Pacific, California, and Oregon. Established at a time when California was held by military government, and when Oregon was a wild untamed wilderness, these lines became the means of developing the richest portion of the American continent, and binding the far distant western world in close connection with the old confederacy,

notwithstanding the mighty Cordilleras and Rocky Mountains which rose like forbidding barriers between them. Important as these possessions were, naturally and geographically, they acquired a new interest about the time that the Pacific and the Aspinwall Steamship Companies were established. The contracts which were made with these companies would certainly have ruined them but for the discovery of gold in California. This opened a new and brilliant field of effort, and the opportunities offered by these companies soon determined tens of thousands of our hardy and enterprising countrymen to enter and develop it.

It is pleasing in this connection to trace the almost mysterious progress of our Pacific territory during the past eight years, and the agencies producing it. Among these agencies none have been so effectual as the Pacific Mail Steamship Company. That Company was compelled to form an establishment of the most effective character four to five thousand miles away from home, and as it was at the time, thirteen thousand miles distant. The country was wholly new, so much so that it was, in most parts of the field which it had to occupy, extremely difficult to procure ordinary food for their operatives. Their ships had to make a voyage more than half of that around the world before they arrived at their point of service; and they found themselves without a home when there. The steamer "California," which left New-York on the 6th October, 1848, was the first to bear the American flag to the Pacific ocean, and the first to salute with a new life the solitudes of that rich and untrodden territory. She was soon followed by the "Panama" and "Oregon," and in due course of time by the "Tennessee," the "Golden Gate," the

"Columbia," the "John L. Stephens," the "Sonora," the "Republic," the "Northerner," the "Fremont," the "Tobago," the "St. Louis," and the "Golden Age." From a small beginning that Company now has the finest steam fleet in the United States, although the difficulties in forming it were probably much greater than any of our other companies had to contend with.

These steamers found nothing ready to receive them in the Pacific. The Company was compelled to construct large workshops and foundries for their repair, and now have at Benicia a large and excellent establishment where they can easily construct a marine engine. They had also to build their own Dry Dock; for that of the Government at Mare Island was not ready until 1854. Theirs has ever been most useful to the United States, as it furnished the only accommodations of that class in the Pacific. They had also to make shore establishments at Panama, San Francisco, and Astoria, which, with coal dépôts, etc., were extremely costly, owing to materials having to be transported so far, and labor at the time being so high. The price of labor in California at all times depends on the profits which can be made by digging gold, and the prices paid for this species of labor have ever been enormous. Beyond this most unusual price of labor along the Pacific seaboard, the coals which they have used, whether from the Eastern States or from England, have been invariably shipped around Cape Horn, and have never cost less than twenty dollars per ton. For a large portion of the time the Company had to pay thirty dollars per ton for coal, and in one instance fifty dollars. Coal, like all other provisions of the steamers, has generally been purchased from those who sent it out

on speculation, and took all the advantages of the peculiar market. Twelve dollars per ton is a low price for freight to California or Panama. In addition to this, the cost price of the coal, the handling, the wastage, and the insurance, will amount to about eight dollars per ton, making it never less than twenty dollars delivered. I have frequently seen coals sell even in Rio de Janeiro, which is but about one third of the distance from us, at eighteen to twenty-four dollars per ton. The nine steamers running consume about 35,000 tons of coal annually. If the vessels transporting it be of 1,000 tons each, it will employ something near thirty-five of these vessels at profitable rates, in this one item of their business alone. Such expenditures are not necessary to any other steam company in the world. The British lines in the Indian Ocean and the China Seas are supplied with domestic coal which comes at very reasonable prices, and is shipped but a short distance.

Yet this Company performs this distant and difficult service with great regularity and at a low price. They have never lost a trip, a mail-bag, or a passenger by marine disaster during the eight years that they have been running in the Pacific. This results from the fact of the Company having thirteen steamers. If all of the steamers now in commission were sunk, they could supply their place from their reserve fleet and have no hiatus in their service. Such a spare fleet is an enormous expense; but it is positively indispensable to regular and highly efficient service. It is singular that under these circumstances they can perform the service at $1.70 cents per mile. It is a notorious fact that these steamers could not have supported themselves in 1854-55 without the aid which they obtained from the Government for the services which

they performed. They never have transported much freight, as it would not bear the transhipment at Panamá. The small quantity which they had was during the first years after the discovery of gold, and then only. They have never at any time brought any eastward. The Panamá Railroad was a splendid consummation of which the world had dreamed for years, and toward whose completion this Company was highly instrumental. Yet it did not enable the steamers to transport freight, and it never will.

These steamers run the 3,300 miles between Panamá and San Francisco by a time-table. They arrive at either end within a very few hours of thirteen and a half days, including all of the stoppages, which are also made at specified hours. Thus the average speed of the steamers is about 254 miles per day. They touch at Acapulco and Mazanilla, and supply San Diego, Monterey, San Pedro, Santa Barbara, San Luis, and Obispo, ports of California, from Panamá by a branch line. This is an extra service, and is not taken into account in calculating the mileage paid the Company.

The steamers have carried probably 175,000 passengers to California, and have brought back about $200,000,000 in gold. They have also by their semi-monthly line from San Francisco to Oregon assisted in populating that rich and beautiful agricultural district, and making it available for useful purposes as a part of the United States. They have converted the wilderness of California into a smiling garden, and will ere long produce the same effect on Oregon. With that coast comparatively unprotected, and with the small standing army sustained in this country, they become very important as a ready means of concentrating on the

Pacific coast a large army in a few days. They also afford a ready transit for the changing crews of our national vessels, which, when once around the Horn, may remain there several years; having to change their crews only.

The large property of this Company in the Pacific can be made available for no other purpose than that for which it was created. Any company to be thoroughly effective there, must create its own stock, and support works on the same general plan as those created by the British East-India Company. Their success in building up this large establishment on the Pacific was simply an accident; and that accident the discovery of gold. But for this the Company would have failed in two years, or gone back pleading to Congress for relief. But the gold crisis saved it, and the enterprise was very remunerative for the first few years; but since 1853 the profits have been limited, while for one or two years the Company have sustained actual loss. They calculated too largely on the prospective business with California, and have too large a sum invested to make much for the future. And yet, with a smaller investment they could not perform the service, except in that dangerous, cheap, indecent way, of innumerable wants and deprivations, which the American people have begun to despise. They have had some few disasters, but none of those of a fatal character in the Pacific. The "Winfield Scott" was lost in entering the harbor of Acapulco; the "Tennessee" in entering that of San Francisco in a dense fog. The "San Francisco" was lost, as will be remembered, on this side, near our coast, as she sailed with troops for the Pacific. The Nicaragua Transit Company fared much worse with their steamers in the Pacific. They lost the "North

America," the "Independence," the "S. S. Lewis," the "Pioneer," and the "Yankee Blade." Mr. Wm. Brown also lost his steamer "America," which he was running between San Francisco and Oregon. She was burned.

Their dividends for four years have been but twelve per cent. And should they be at any time thrown out of the service, more than half of their property would be irretrievably lost. This percentage of dividend would be large enough but for such possibilities as these, which may soon reduce it to a deficit and a loss. Thus it is that steam stock should declare three times the dividend of other stocks, to be eventually equal to them. And hence it is that, with the clear record of this Company before the Government, and with an investment of between three and four millions of dollars, being at the same time free from debt, the stock of the Company is selling at thirty-three per cent. below par. This is a good exemplification of my views in the preceding SECTIONS regarding the costs, and hazards, and low values of ocean steam stocks generally. Nor are the stocks of this Company kept from the public. They are advertised and sold at public auction at these reduced rates every day in the year in this city; and no one of the five hundred and four stockholders, among whom these interests are diffused, seems anxious to put "his all" in the enterprise. And yet there are some people who call such companies a monopoly. If a monopoly, why do they not come forward, buy the stocks, keep them in their own hands, and profit by them; especially as a monopoly must be doubly good when it can be bought for two thirds the cash originally paid for it!

I have noticed this Company thus fully, because its

extent of stock, and large field of operation, make it a fit illustration of the views which I have advanced throughout this work. I have no desire to depreciate the stock, or in any other way injure the Company, as my own enterprise gives me quite enough to do.

Many of the views advanced with regard to the Pacific Mail Company will apply to the United States Mail Steamship Company. That Company, at the outset, built very fine steamers, and ran them incessantly, until they were unfit for duty. They have constantly supplied their place, and have at all times, by building and by chartering at the highest prices, kept up a large and costly fleet for their ramified service. The service contemplated in their original contract, at $\$1.88^{3}/_{4}$ cents per mile, is but about two thirds of that actually performed. The contract required them to run 3,200 miles semi-monthly, but they actually perform semi-monthly 5,200. (*See Mr. King's Letter,* *Paper G.*) The actual service has required nearly twice the number of steamers necessary to do that for which they contracted, although a part of it is in the coasting trade. Consequently the steamers have been rapidly worn out, from too heavy duty, and the stock of the Company has never paid as well as it should. The Company have, morever, suffered severely from disaster. The "Crescent City" was lost on the Bahama Banks, in 1855; all hands saved. The "Cherokee" was burned when in active service, in 1853; and the "George Law," or "Central America," but recently foundered at sea in a terrible gale. They were all good ships; but like those other excellent ships, the "Arctic" and "Pacific," they could not defy the powers of pure accident. In the same gale the "Empire City" was dismantled, having all of her upper works swept

off, while the "Illinois" was injured by being on the Colorado Reef. They have both been undergoing most costly repairs for several weeks. While writing this, the "Philadelphia" is also in the shop. She recently broke her shaft and her cross-tail, and had to put into Charleston. All of these repairs cost an immense sum of money, and are calculated, with the severe losses which the Company has sustained, to dishearten the most hopeful and enterprising. Yet, since these disasters, and the completion of the "Moses Taylor," the Company are about laying the keel of another fine ship. This is another verification of my statement that the mail companies are in nearly every instance compelled to build new steamers in the very last years of their contracted service. The new "Adriatic" attests the same fact on the part of the Collins Company. (*See pages 141 and 142.*)

The Company have had at various times the "Falcon," "Ohio," "Georgia," "Crescent City," "El Dorado," "Cherokee," "Empire City," "Illinois," and "Philadelphia," and now have the three last-named ships, the "Granáda," the "Star of the West," and the new steamer "Moses Taylor." The benefits conferred by the Company's lines on the trade of the country generally, and especially on our southern seaboard and Gulf connections, have been almost incalculable. They found all of these ports in the undisputed possession of the British, whose steamers furnished the only mail and locomotive facilities of the times. By their superior speed and accommodations the "Georgia" and the "Ohio" soon drove those enterprising steamers from our coast, and confined them to the foreign countries of the Gulf and the Carribean Sea, where they yet rule triumphant in

news, transport, and commerce. Our southern harbors are no longer filled with British cruisers, while in their stead we have built up a noble war marine, inured thousands of Americans to the ocean steam service, and made one most effective movement in the direction of successful defenses. (*See Letter of Hon. Edwin Croswell, Paper E, page 200.*)

Of the Collins Company it is hardly necessary that I should speak. They have received much the largest subsidy from the Government; but they have had a most difficult task to perform. Their ships have never been surpassed in any country, whether as to the excellent style of their prime construction, their large size, or their very unusual speed. They have literally been engaged in a continual race across the ocean for seven years, determined at whatever cost and hazard to far excel those of the Cunard line. And this they have done most signally in all points of accommodation and speed. They have gained one and a half days the advantage over the Cunard line on their average voyages for the seven years. And this was no small achievement. By reference to SECTION IV. it will be seen how great is the cost of attaining and maintaining such speed with a steamer. The Collins ships, being so much larger than the Cunarders, the four present an aggregate tonnage nearly equal to the eight by which they run their weekly line. It is, moreover, not proportionally so expensive to maintain seven or eight ships on a line as four. The prime cost and repairs are by no means so great when engines are duplicated, or two sets built from the same patterns. Again, the general outlay in docks, shore establishment, offices, company paraphernalia, advertising, and innumerable items, is as great for a small as for a

large fleet of steamers. The Collins line has to contend against all this. It also found the Cunard line long and well established, and inwrought into the public favor. It had the business, and most important of all, it monopolized the only freights passing between the two countries; those from England to America, which British shippers gave of course to British ships. They have had also to pay much larger prices for construction, repairs, wages, etc., than the Cunard Company; and not having so large a service and so large a fleet, they have not had so many reserve ships to fall back upon; but have been compelled frequently to send their ships off but half repaired, which of itself entailed immensely heavy expenses in ultimate repairs. There is very much to be said in favor of this Company, which has endeavored to build the finest ships in the world, and navigate them the most rapidly. If they have prominently failed in any thing it is in building larger ships, running them faster, and being far more enterprising with them than was required of the Company by the contract with the Government. Their disasters have been saddening and severe; and yet they have resulted from nothing which could have been controlled by human foresight. There is a great error in supposing that there are more marine disasters among American than among British ships. Such is not the case, as a careful examination of the lists will show.

Of the mail line belonging to Mr. Vanderbilt, between New-York and Bremen, *via* Southampton, it is impossible now to say any thing. The steamers "North Star" and "Ariel," the one of $1{,}867^{60}/_{95}$ tons, and the other of $1{,}295^{28}/_{95}$ tons, have but recently commenced the service, on the gross mail receipts.

Whether Mr. Vanderbilt desires to make the service permanent or not, I am not advised.

The service of the Charleston and Havana line has been performed with great regularity; and although the return from it in the form of postages has been small, yet it has been of essential service to the South, in opening communications toward the Gulf, and in establishing much needed travelling facilities between Charleston, Savannah, and Key West.

PAPER A.

LIST OF AMERICAN OCEAN STEAMERS.

The mail service has 8 lines, and 21 steamers in commission, of 48,027 registered tonnage. Much of this tonnage belongs to supply ships, as for instance those of the Pacific Mail Steamship Company. (*See Section I.*)

Collins Line, 3 steamers, 9,727 tons.

Adriatic, $4{,}144^{74}/_{95}$ tons: Atlantic, $2{,}849^{66}/_{99}$ tons: Baltic, $2{,}733^{1}/_{95}$ tons.

Havre Line, 2 steamers, 4,548 tons.

Arago, 2,240 tons: Fulton, 2,308 tons.

Vanderbilt Bremen Line, 3 steamers, 6,523 tons.

North Star, $1{,}867^{60}/_{95}$ tons: Ariel, $1{,}295^{28}/_{95}$ tons: Vanderbilt[H], $3{,}360^{54}/_{95}$ tons.

[H] Independent, running between New-York, Southampton, and Havre, in connection with the Bremen steamers.

United States Mail Steamship Company, 6 steamers, 8,544 tons.

Illinois, $2{,}123^{65}/_{95}$ tons: Empire City, $1{,}751^{21}/_{95}$ tons: Philadelphia, $1{,}238^{1}/_{95}$ tons: Granada, $1{,}058^{90}/_{95}$ tons: Moses Taylor, 1,200 tons: Star of the West, chartered, $1{,}172^{1}/_{95}$, (contracting for a new ship.)

Pacific Mail Steamship Company, 13 steamers, 16,421 tons.

Golden Gate, $2{,}067^{35}/_{95}$ tons: Golden Age, 2,280 tons: J. L. Stephens, 2,189 tons: Sonora, 1,616 tons: St. Louis, 1,621 tons: Panamá, $1{,}087^{31}/_{95}$ tons: California, $1{,}085^{64}/_{95}$ tons: Oregon, $1{,}099^{9}/_{95}$ tons: Columbia, $777^{34}/_{95}$ tons: Republic, 850 tons: Northerner, 1,010 tons: Fremont, 576 tons: Tobago, 189 tons.

Charleston, Savannah, Key West, and Havana, 1 steamer, the Isabel, 1,115 tons.

New-Orleans and Mexico, 1 steamer, the Tennessee, $1{,}149^{1}/_{2}$ tons.

The Coasting Service has 8 lines, and 23 steamers, of 24,071 tons registered tonnage.

New-York, Havana, and New-Orleans, 2. The Black Warrior, $1{,}556^{1}/_{95}$ tons: Cahawba, $1{,}643^{1}/_{95}$ tons =

3,199 tons.

New-York, Havana, and Mobile, 1. The Quaker City, $1{,}428^{3}/_{95}$ tons.

New-York and Savannah, 4. Alabama, $1{,}261^{13}/_{95}$ tons; Florida, $1{,}261^{13}/_{95}$ tons: Augusta, $1{,}310^{61}/_{95}$ tons; Star of the South, (propeller,) $960^{1}/_{95}$ tons = 4,793 tons.

New-York and Charleston, 4. Columbia, 1,347 tons: Nashville, 1,220 tons: James Adger, 1,151 tons; Marion, 962 tons = 4,680 tons.

New-York and Virginia, 2. Roanoke, 1,071 tons: Jamestown, 1,300 tons = 2,371 tons.

Philadelphia and Savannah, 2. Key Stone State and State of Georgia, each about 1,300 tons = 2,600 tons.

Boston and Baltimore, 2. Joseph Whitney, 800 tons: Unknown, 800 tons = 1,600 tons.

New-Orleans and Texas. The Charles Morgan, Texas, Mexico, and Atlantic, averaging 600 tons each = 2,400 tons.

New-Orleans and Key West. The General Rusk, 600 tons, and the Calhoun, 400 tons = 1,000 tons.

There are also several propellers running: between New-York and Charleston, New-York and Portland, and between Philadelphia and the South. They are all, however, small, and irregular in their trade. The Calhoun is not a regular steamship.

Steamers lying up, 18. Registered tonnage,

24,845 tons.

Queen of the Pacific,	2,801	$^{92}/_{95}$	tons.
Washington,	1,640	$^{71}/_{91}$	tons.
Prometheus,	1,207	$^{61}/_{95}$	tons.
St. Louis,	1,621	$^{14}/_{45}$	tons.
Brother Jonathan,	1,359	$^{52}/_{95}$	tons.
Oregon,	1,004	$^{89}/_{95}$	tons.
Southerner,	900		tons.
Herman,	1,734	$^{45}/_{95}$	tons.
Northern Light,	1,747	$^{91}/_{95}$	tons.
Uncle Sam,	1,433	$^{44}/_{95}$	tons.
California,	1,058		tons.
Northerner,	1,012		tons.
Ericsson,	1,902	$^{1}/_{95}$	tons.
Star of the West,	1,172	$^{33}/_{95}$	tons.
Daniel Webster,	1,035		tons.
Orizaba,	1,450	$^{62}/_{95}$	tons.
Panamá,	1,087		tons.
Fremont,	576		tons.

The registered tonnage of these vessels was furnished me by Mr. S. P. Ingraham, of the New-York Custom-House.

PAPER B.

The following paper, prepared by Mr. Pliny Miles from the reports to which we have alluded, presents

the British steam mail service in full detail.

"The following tabular statement gives the particulars of the ocean mail service of Great Britain, now carried on almost exclusively by steamships. The numbers in the margin, running from 1 to 15, will point out the different lines in the recapitulation at the close.

Line of Communication, Contractors, and Contract Price.	**Places Connected.**
1.—Liverpool and Isle of Man. *Mona Isle Steam Co.* Twice a week. $4,250 per annum.	Liverpool and Douglas, Isle of Man.
2.—England and Ireland. *City of Dublin Steam Packet Co.* Twice a day. $125,000 a year.	Holyhead and Kingstown, near Dublin.
3.—Scotland and Shetland. *Aberdeen, Leith and Clyde Shipping Co.* Weekly, $6,000 a year.	Aberdeen, Wick, Kirkwall, (Orkney,) and Lerwick, (Shetland.)

4.—England, Spain, and Gibraltar. *Peninsular and Oriental Steam Navigation Co.* Three times a month. $102,500.	Southampton, Vigo, Oporto, Lisbon, Cadiz, and Gibraltar.
5.—Mediterranean, India, and China. *Peninsular and Oriental Steam Navigation Co.* Twice a month to India—monthly to China. $1,121,500.	Southampton, Malta, Alexandria, Suez, Aden, Bombay, Calcutta, Singapore, Hong Kong, and Shanghae.
6.—England and United States. *Sam. Cunard.* Weekly. $866,700.	Liverpool, Halifax, and Boston; and Liverpool and New-York.
7.—North America, (Colonial.) *Sam. Cunard.* Monthly. $73,500.	Halifax, Newfoundland, Bermuda, and St. Thomas.

8.—West-Indies, Mexico and South-America. *Royal Mail Steam Packet Co.* Semi-monthly to the West-Indies and Gulf of Mexico, and monthly to Brazil. $1,350,000.	Southampton, Kingston, (Jamaica,) St. Thomas, Vera Cruz and Aspinwall; Southampton, Lisbon, Madeira, Teneriffe, St. Vincent, Pernambuco, Bahia, Rio Janeiro, Monte Video, Buenos Ayres, and St. Thomas.
9.—England, France, and Belgium. *Jenkings and Churchward.* Daily to Calais; thrice a week to Ostend. $77,500.	Dover and Calais. Dover and Ostend.
10.—Channel Islands. *South-western Railway Company.* Thrice a week. $20,000.	Southampton, Jersey, and Guernsey.

11.—West Coast of South-America. *Pacific Steam Navigation Co.* Twice a month. $125,000.	Panama, Callao, and Valparaiso. Allowed to touch at Buenaventura, Guayaquil, Peyta, Lambayeque, Huanchaco, Santa, Pisco, Islay, Aríca, Iquique, Cobija, Gopiapo, Huasco, and Coquimbo.
12.—Scotland and Orkney. *John Stanger, Esq., of Stromness.* Daily in summer; every other day in winter. $6,500.	From Scrabster Pier (Thurso) to Stromness, (Orkney.)
13.—West Coast of Africa. *African Steamship Co.* Monthly. $106,250.	Plymouth to Madeira, Teneriffe, Goree, Bathurst, Sierra Leone, Monrovia, Cape Coast Castle, Accra, Whydah, Badagry, Lagos, Bonny, Old Calabar, Cameroon and Fernando Po; omitting Cameroon, Calabar, and Bonny on return.

14.—South-Africa, Mauritius, and Calcutta. *Adam Duncan Dundas, Esq.* Monthly. $205,000.	Dartmouth to Cape of Good Hope, Mauritius and Calcutta.
15.—England and Australia. *The European and Australian Mail Steam Packet Co.* Monthly. $925,000.	Southampton, Marseilles, Malta, Alexandria, Suez, and Sydney.

The following are the names of the steamers in service in each line, with the amount of tonnage, the horse power of each, the draught of water, the number of the officers and crew attached to each one, and, when it could be obtained, the date that each vessel was surveyed and approved for the service. Where the date of survey of a vessel is unknown, it is placed as near as possible with others surveyed at the same time, the vessels in each line being arranged in chronological order:

Name, Class, etc.	*Horse Power.*	*Tonnage.*	*Draft of Water.*		*Cr*
			F.	I.	
1. LIVERPOOL AND ISLE OF MAN.					
King Orry,	190	429	0	0	2
Tynwald, iron,	260	657	8	9	2

Benmy Chree,		130	295	6	6	1
Mona's Queen,	iron,	220	508	8	6	2
Total, 4 vessels,		790	2,089			9
2. ENGLAND AND IRELAND.						
Prince Arthur,	iron,	220	418	8	8	2
Llewellyn,	iron,	342	654	9	6	2
Eblana,	iron,	372	685	8	11	3
St. Columba,	iron,	350	650	8	10	2
Total, 4 vessels,		1,284	2,407			11
3. SCOTLAND AND SHETLAND.						
Fairy,		120	350	—	—	1
Duke of Richmond,		180	500	—	—	2
Total, 2 vessels,		300	850			4
4. ENGLAND, SPAIN, AND GIBRALTAR.						
Sultan,	iron,	420	1,001	14	0	6
Madrid,	iron,	133	448	10	2	4
Tagus,		280	691	14	8	4
Alhambra,		140	642	13	7	5
Total, 4 vessels,		973	2,782			20
5. MEDITERRANEAN, INDIA, AND CHINA.						
Lady Mary Wood,		270	619	0	0	4
Precursor,		520	1,783	18	0	12

Pekin,	iron,	415	1,003	14	0	7
Oriental,		420	1,427	13	0	7
Achilles,		430	823	16	0	5
Malta,	iron,	460	1,222	0	0	8
Hindostan,		500	1,595	16	10	5
Singapore,	iron,	465	1,189	12	6	9
Ganges,	iron,	465	1,189	14	7	6
Pottinger,	iron,	450	1,275	17	6	8
Formosa,	iron, screw,	177	658	13	6	6
Chusan,	iron, screw,	100	765	11	3	4
Haddington,	iron,	450	1,303	17	7	10
Vectis,		400	900	0	0	5
Shanghae,	iron, screw,	90	825	0	0	6
Manila,		60	646	0	0	6
Bentinck,		520	1,973	19	3	8
Euxine,	iron,	430	1,071	15	6	7
Bengal,	screw,	465	2,185	17	6	11
Valetta,		400	984	12	2	5
Norna,	screw,	230	1,040	0	0	8

Colombo, screw,		450	1,808	0	0	11
Ripon,	iron,	445	1,400	14	9	9
Douro, screw,		230	903	13	3	6
Bombay,		280	1,240	0	0	8
Madras,		288	1,217	0	0	8
Indus,	iron,	450	1,302	17	9	8
Candia, screw,	iron,	450	2,212	18	9	11
Nubia,		450	2,095	21	0	12
Pera, screw,	iron,	450	2,013	19	0	12
Ava, screw,	iron,	320	1,372	17	0	9
Alma, screw,	iron,	450	2,164	20	0	12
Aden, screw,	iron,	210	507	18	9	4
Delta, screw,		210	985	0	0	6
Delhi, screw,		450	2,400	0	0	12
Unknown, 4 vessels.						
Total, 39 vessels,		12,850	46,053			2,8
6. England and United States.						
Europa,		650	1,777	15	6	8
Canada,		680	1,774	19	6	8
Niagara,		630	1,774	19	6	8

America,	630	1,729	15	3	8
Asia,	800	2,073	19	0	1(
Africa,	800	2,050	0	0	1(
Arabia,	870	2,328	16	7	1(
Persia,	858	3,587	21	0	1(
Total, 8 vessels,	5,918	17,092			9(
7. NORTH AMERICA, (Colonial.)					
Merlin,	120	451	0	0	2
Delta, iron, screw,	180	700	12	10	3
Total, 2 vessels,	300	1,151			6
8. WEST-INDIES, MEXICO, AND SOUTH-AMERI(					
Dee,	410	1,269	18	0	8
Trent,	450	1,293	17	7	8
Eagle,	263	496	11	10	5
Derwent,	280	708	15	0	6
Magdalena,	760	2,250	19	0	1(
Medway,	420	1,305	17	6	7
La Plata,	939	2,404	21	10	11
Conway,	270	827	12	10	5

Orinoco,		800	2,245	20	11	1(
Avon,		450	2,069	17	0	9
Teviot,		450	1,258	18	1	9
Paraná,		800	2,222	21	2	1:
Clyde,		430	1,335	19	1	8
Thames,		413	1,285	18	3	7
Solent,		420	1,805	14	11	8
Camilia,	iron,	213	640	9	0	3
Wye, screw,	iron,	180	818	14	0	4
Atrato,	iron,	758	2,906	20	6	1:
Tamar,		400	1,873	18	7	9
Prince,		200	446	8	8	3
Total, 20 vessels,		9,306	29,454			1,6
9. England, France, and Belgium.						
Alliance,		120	300	7	3	1
Vivid,		120	300	7	0	1
Violet,		120	300	7	0	1
Empress,		100	308	6	6	1
Queen,		100	307	6	6	1
Ondine,		80	250	6	0	1
Total, 6 vessels,		640	1,765			9
10. Channel Islands.						

Atalanta,		120	240	8	4	2
Wonder,	iron,	150	449	0	0	2
Courier,	iron,	184	440	7	0	1
Dispatch,	iron,	183	443	7	6	2
Express,	iron,	160	380	7	4	2
Total, 5 vessels,		797	1,852			1(
11. West Coast or South-America.						
New-Granada,	iron,	210	600	13	0	4
Bolivia,	iron,	252	705	0	0	4
Inca,	iron,	370	549	13	0	5
Lima,	iron,	370	1,122	10	8	5
Bogota,	iron,	394	1,122	13	6	6
Valdivia,	iron,	480	782	13	2	4
screw, Valparaiso,	iron,	320	839	13	6	8
Total, 7 vessels,		2,396	5,719			3(
12. Scotland and Orkney.						
(Unknown,)		60	250	6	0	1
13. West Coast of Africa.						
Hope,	iron,	120	833	15	0	4
Charity,	iron,	120	1,007	15	6	5
Ethiope,		120	674	0	0	4
Candace,		120	900	0	0	4
Retriever,		120	900	0	0	4
Niger,		120	900	0	0	4

Gambia,	130	637	14	0	4
Total, 7 vessels,	850	5,951			32
14. SOUTH-AMERICA, MAURITIUS, AND CALCUT					
Five screw steamers, Total, 5 vessels,	2,000	8,000	—	—	57
15. ENGLAND AND AUSTRALIA.					
Oneida,	400	1,600	15	6	8
Simla,	630	2,510	17	2	8
European,	530	2,200	18	9	11
Columbian,	530	2,300	17	6	12
(Unknown,)	400	1,600	0	8	8
(Unknown,)	400	1,600	0	8	8
(Unknown,)	400	1,600	0	8	8
Total, 7 vessels,	3,290	13,410			67

RECAPITULATION.

Lines.	*Number of steamers.*	*Horse Power.*	*Tonnage.*	*Number of men.*	*Ser comm*
1	4	790	2,089	91	18
2	4	1,284	2,408	115	18
3	2	300	850	42	18
4	4	973	2,782	200	18
5	35	12,850	46,053	2,877	18
6	9	6,418	18,406	922	18

7	2	300	1,151	60	18
8	20	9,308	29,454	1,667	18
9	6	640	1,765	96	18
10	5	797	1,852	107	18
11	7	2,396	5,719	378	18
12	1	60	250	16	18
13	7	850	5,951	320	18
14	5	2,000	8,000	575	18
15	7	3,290	13,410	671	18
Total,	121	42,254	140,139	8,137	

[I] There are some lines not here noticed, which swell the sum to $5,333,985.—T. R.

PAPER C.

PROJET OF FRANCO-AMERICAN NAVIGATION.

MR. Wm. Iselin, of Havre, kindly furnished me the following:

"The French Government has offered the following contracts:

"Havre to New-York, 26 voyages a year, fr.3,100,000, or $620,000.

"Bordeaux to Rio Janeiro, touching at Lisbon, Goree, Bahia, or Pernambúco, and a branch line from Rio Janeiro to Montevideo and Buenos Ayres, 24 voyages a year, fr.4,700,000, or $940,000. The Government now requires 13 departures from Bordeaux and 13 from Marseilles at the same price.

"Nantes to St. Thomas, thence to Guadalupe, and thence to Martinique, with the following branch lines:

"No. 1. St. Thomas to St. Martha or Carthagena, and thence to Aspinwall.

"No. 2. St. Thomas to Porto Rico, thence to Havana, Vera Cruz, and Tampico.

"No. 3. From Martinique to Cayenne.

"The subvention offered is fr.6,200,000, or $1,400,000.

"The total amount of subvention offered for the 3 lines is therefore 14 millions of francs per annum, or $2,800,000.

"The Messageries Impériales have given a tender for the Brazil lines.

"William Iselin of Havre, in connection with Mr. Calley St. Paul, for the Havre and New-York line; the necessary capital of $3,200,000 is subscribed; their intention is to have a weekly departure from Havre to New-York, by making the fortnightly departures of the French boats alternate with American Havre and Bremen boats.

"For the line from Nantes to the West-Indies the Company Gautier is said to have given a tender; but it is doubtful if they can make up their capital."

The *Messageries Impériales* is one of the largest and strongest companies in all Europe. They have the following different lines: the Italian, the Constantinople direct, the Levant, the Egyptian, the Syrian, that of the Archipelago, the Anatolia, the Thessalian, the Danubian, the Trebizond, the Algiers, the Oran, and the Tunis lines, and forty-seven sea-steamers. They have already obtained the Brazilian

service.

Mr. Iselin and others have proposed for the United States line, and will doubtless get it.

The Company Gautier may not get the West-India service, it is said. They had the line from Havre to New-York, with the steamers Alma, Cadis, Barcelona, Franc-Contois, Vigo, and the Lyonnaise, and without subvention. They found it impossible to run it without subsidy, and hence, sought a new home for their steamers. They attempted to run from Havre to New-Orleans; but this again failed, after four voyages. They had also the 1,800 ton ether ships, "François Arago," and "Jacquart," which broke down. These ether engines were built on the principle of De Tremblay; but the Company are now substituting steam for the ether engines. Thus, the experience of this Company proves two important positions which I have taken; that ocean mail steamers can not run on their receipts, and that many of the gazetted improvements on steam propulsion and the ordinary methods are valueless.

The *Compagnie Gautier* have a contract with Spain, for semi-monthly voyages between Cadiz and Havana, and receive $25,000 per round voyage for each steamer. They are all English built, iron vessels, of about 1,800 tons each. Lyons is the home of the Company.

PAPER D.

STEAM LINES BETWEEN EUROPE AND AMERICA.

COLLINS, steamers Adriatic, Atlantic, and Baltic; (running:)

HAVRE, steamers Arago, and Fulton; (running:)

BREMEN, steamers North Star, and Ariel; (running:)

HAVRE, *in connection with the Bremen*. Steamer Vanderbilt; (laid up:)

CUNARD, steamers Persia, Arabia, Asia, Africa, Canada, America, Niagara, and Europa; (running:)

CUNARD, screw-steamers Etna, Jura, Emue, Lebanon, and Cambria, (side-wheel; all running:)

GLASGOW, screw-steamers Glasgow, Edinburgh, and New-York; (running:)

BREMEN, steamer Ericsson; run temporarily by Mr. Sands; (laid up:)

LIVERPOOL AND PORTLAND, screw-steamers Khersonese and Circassian, General Williams and Antelope; the two latter about 1,500 each, running *via* St. John's, N. F., the two former chartered for the East-Indies:

LONDON AND MONTREAL, screw-steamers; (names not known:)

LIVERPOOL AND QUEBEC, screw-steamers; (names not known:)

LIVERPOOL AND NEW-YORK, screw-steamers City of

Manchester, City of Baltimore, City of Washington, and Kangaroo, (running;) (line ran to Philadelphia and was withdrawn:)

HAMBURG AND NEW-YORK, screw-steamers Borussia and Hammonia; building two more steamers, each 2,000 tons, in the Clyde, for same line; (running:)

ANTWERP AND NEW-YORK, screw-steamers Belgique, Constitution, Leopold I., Duc de Brabant, and Congress. *Taken off and chartered to British Government for transporting troops. Names altered:*

LONDON, CORK AND NEW-YORK, screw-steamers Minna and Brenda; (laid up:)

HAVRE AND NEW-YORK, screw-steamers Barcelona, Jacquart, Alma, and François Arago, *withdrawn, and running from Spain to Cuba*. (*See Paper C.*)

BREMEN AND NEW-YORK. The North Dutch Lloyds are building four screw-steamers in the Clyde, of near 3,000 each, to run between Bremen and New-York:

THE CONTINENT, SOUTHAMPTON AND NEW-YORK. Croskey's lino consists of the following screws, of about 2,300 tons each: the Argo, Calcutta, Queen of the South, Lady Jocelyn, Hydaspes, Indiana, Jason, and Golden Fleece. (*Most of these steamers have been withdrawn from the route, and five of them are chartered for troops for India.*)

PAPER E.

The following numerous extracts from the Senate Reports of 1850 and 1852, and also from the letter of Judge Collamer, then Post Master General, as well as from a letter by the Hon. Edwin Croswell, will present in detail a strong corroboration of the views which I have taken in the preceding SECTIONS. I copy first from the Report of 1852. The Committee was composed of Hon. Thomas J. Rusk, Chairman, and Messrs. Soulé, Hamlin, Upham, and Morton. The Report says:

> "Your Committee desire to have it understood at the outset, that, regarding the ocean mail service as the offspring of the wants of all of the producing classes of the country, they have not felt at liberty to consider the propositions which have been presented to them, in any other point of view than as connected with and subservient to the general policy of the government, which embraces alike every section of the country, and can not know nor recognize any personal or local influence.
>
> "The system of ocean steam navigation was adopted by the Government for the joint purpose of extending and advancing the commercial and other great interests of the country, and, at the same time, providing a marine force which might be easily made available for the protection of American rights, in the event of a collision with foreign powers. The attainment of this double object was the motive which, in the opinion of

Congress, justified the advance of public funds in aid of private enterprise, inasmuch as it was calculated to insure to the country the acquisition of a powerful means of maritime defense, with little or no expense, eventually, as the money so advanced was to be reimbursed in money or in mail service at the option of the parties concerned, while commerce and the arts would be promoted during the time of peace.

"At the time when this system was commenced, the ocean mails along our whole Southern coast were in the hands of foreign carriers, sustained and encouraged by the British Government, under the forms of contracts to carry the British mails; while the Cunard line between Liverpool and Boston, *via* Halifax, constituted the only medium of regular steam mail communication between the United States and Europe. In this way the commercial interests of the United States were, on the one hand, entirely at the mercy of British steamers which plied along our Southern coast, entering our ports at pleasure, and thereby acquiring an intimate knowledge of the soundings and other peculiarities of our harbors—a knowledge which might prove infinitely injurious to us in the event of a war with Great Britain; and on the other, of a foreign line of ocean mail steamers, which, under the liberal patronage of the British Government, monopolized the steam mail postage and freights between the two countries. Under such a state of things, it became necessary to choose whether

American commerce should continue to be thus tributary to British maritime supremacy, or an American medium of communication should be established through the intervention of the Federal Government, in the form of advances of pecuniary means in aid of individual enterprise. It had been found to be impossible for our merchants to contend successfully, single handed, against the joint efforts of the British Government and British commercial influence. Our noble lines of packet ships which had far outstripped the sailing vessels of all other nations, in point of beauty and swiftness, had been superseded by the introduction of steamers, the power and capacity of which recommended them, as the best means of inter-communication by mail, and of transportation for lighter and more profitable freights, and American interests were becoming every day more and more tributary to British ascendency on the ocean.

"Under the circumstances above stated, it was impossible for Congress to hesitate for a moment which course to pursue, and it was determined to adopt a policy which, while it would be in strict accordance with the spirit of our free institutions, should place the country in its proper attitude, and render its commerce and postal arrangements independent of all foreign or rival agencies.

"Of the correctness of this determination, experience has furnished the most ample evidences in the results which thus far have attended the prosecution of the system. The

line between New-York and Chagres *via* New-Orleans and its auxiliaries, have, by their superiority in point of swiftness and accommodation, already superseded the British steamers which had previously plied along our Southern maritime frontier, and the United States mails for Mexico, South-America, and our possessions on the Pacific are no longer in the hands of foreign carriers, but are transported in American steamers of the first class, convertible, at a very small expense, into war steamers, should occasion require, which have commanded the admiration of the world by their fleetness and the elegance of their accommodations for the travelling public. Our Southern ports are, consequently, no longer frequented by British steamers, commanded by officers of the British crown, whose legitimate business it is to collect intelligence respecting the approaches to and defenses of the harbors which they visit, to be made available for their own purposes, in the event of the existence of hostile relations.

"A similar result has, to a certain extent, attended the establishment of the American, or Collins line, between New-York and Liverpool. Previously to the commencement of this line, the transportation of the United States mail matter, as well as the finer and more destructible descriptions of merchandise, requiring rapidity of transmission to and from Europe, had been monopolized by the British Cunard line; and the British Government had, within the short

> space of six years, from the postage on this route alone, derived a *clear income* of no less than five million two hundred and eighty thousand eight hundred dollars, after deducting the amount paid to the concern under the contract to carry the mails.
>
> "Since the establishment of the Collins line, notwithstanding the combined efforts of the British Government and commercial interests to confine their freights and postages to the Cunard line, the revenue to the Post Office Department of the United States has amounted to several hundreds of thousands of dollars per annum, whilst a large proportion of the money for freights has been received by American citizens. The effects of this measure have, it is true, thus far been but partial, because the trips of this line have been but twice a month, while those of its rival have, for a considerable portion of the time been weekly. During the intervals between the trips of the American line, the postages and freights must, of necessity, enure to the advantage of the British, and, consequently, the evil referred to has been but partially remedied."

Speaking of the large steamers built, the Report says:

> "It is not to be supposed that engines of such vast dimensions could have been constructed in a country where there were, as yet, no workshops adapted to the purpose and where labor is very high, as cheaply as in a country where every appliance of the kind already existed and where the prices of labor are

proverbially low. Nor can it be reasonably imagined that vessels of this description could have been navigated on as good terms, by men taken from this country, where there was little or no competition in this peculiar branch of maritime service, as by those who were easily to be found in a country in which the density of population and consequent competition for employment, caused the wages to be small.

"An attempt seems to have been made, in certain quarters, to create an impression that the aid heretofore extended by the Government to the individuals engaged under contracts to carry the ocean mail, has been induced by feelings of personal friendship, on the part of members of Congress. Such is not the case. The friends of the system of ocean mail steam navigation, have, so far as your Committee are advised, considered this important subject as a matter of great national concern and independently of the very secondary motive of individual interest. The question presented to their minds has not been whether A, B, or C should have a privilege extended to him, but whether the commerce, manufactures, and agriculture of the country would be benefited by the performance of a public service through the instrumentality of individual enterprise, under proper conditions and restrictions. As matters stood at the period when the system was adopted, Great Britain was exerting herself, successfully, to make the United States, in

common with the rest of the world, tributary to her maritime supremacy. She possessed the monopoly of steam connection between the United States and Europe, the West-Indies and South-America. There was not a letter sent by ocean steam conveyance, in these quarters, which did not pay its tribute to the British crown, and not a passenger nor parcel of merchandise transported, by the agency of steam, upon the ocean, which did not furnish profit to the British capitalist. Great Britain asserted her right to be the 'queen of the ocean,' and, as such, she levied her imposts upon the industry and intelligence of all of the nations that frequented that highway of the world.

"In this condition of affairs, the law instituting the system of American ocean mail steam transportation in its present form was enacted, as the best, if not the only means of correcting a great evil, and, at the same time, building up a naval force which should be available for national defense in the event of a war. The system so instituted was deemed to be not only calculated to draw forth and reward the enterprise of American citizens, but it avoided the difficulty of keeping upon hand, in time of peace, a large and, for the moment at least, useless military marine, which could only be preserved in a condition for effective service by a vast annual outlay of the public money.

"*It was right and proper, then, in the opinion of your Committee, that these ocean steam facilities should exist, through the intervention*

of the Government, more especially as they were, in all probability, beyond the reach of private means.

"The transportation of the ocean mails, with the greatest possible advantage to the important interests of the country at large, is an object of paramount importance; but which, however desirable, can only be effected at great expense. It is a matter of comparatively small moment at what precise time this expense is to be paid, provided that the end in view can be attained with certainty. The temporary loan of a part of the means required, under proper securities for reimbursement, appears to be the readiest mode by which the purpose can be effected. How is this security to be acquired? Simply, by taking due care that the funds advanced shall be faithfully and honestly applied to the object for which they are intended, and then holding a lien upon the ships, for the construction of which they are appropriated, in such a manner as to insure the reimbursement of the sums advanced in the form of mail service or money; or, should circumstances require, of ships suitable for national purposes, as war steamers. This has been done. In all cases the contractors for the transportation of the ocean mails, have been required to cause their ships to be built and equipped under the immediate superintendence of experienced naval officers and under the direction of naval constructors, appointed by the Government, in such manner as to be convertible, at the

smallest possible expense, into war steamers of the first class.

"Nor has experience caused any regret, on the part of the friends of the system, further than that in some cases, owing to the increase in the tonnage and power of the ships and other circumstances, the expenses incurred by the contractors have outrun the receipts, and they have incurred heavy losses, which might even prove ruinous, if they were forced to sell the property acquired in this form. It should always be borne in mind, however, that in these cases, the increase of expenditure thus incurred has been caused by a laudable ambition on the part of the proprietors of these lines to do even more than they were required to do under their contracts, with a view to secure the confidence of the Government and the public. It should also be remembered that in thus increasing the cost and consequent value of their ships, these companies have enlarged the security of the Government for the money loaned, and promoted the safety and comfort of passengers. It has, in no instance, been charged that the companies referred to have, in any way, misapplied the aid extended to them, or given to it an improper direction. The products of their expenditures, even admitting them to have been greater than they might have been, show for themselves, in placing the American steam mail service, as far as it has gone, at the head of all others, in point of accommodation, elegance, strength, and

swiftness. Nor is this all. The establishment of these lines is not to be regarded merely with reference to the immediate profits arising from the system, in connection with the transportation of the mails. Millions of money have been saved to American citizens, which, in the absence of these ocean steam lines, would have gone to fill foreign coffers. The Committee will refer to one fact in illustration of the truth of this proposition. Before the Collins line was established, the Cunard line was receiving £7 10*s* sterling per ton for freights; at present (1852) the rate is about £4 sterling. By whom were these £7 10*s* sterling paid? By the *American consumer*, in most instances, upon articles of *British manufacture brought to this country by a British line*. At present the American consumer pays but £4 sterling per ton; and, presuming that the American merchant makes his importations in the American line, this freight is paid to our own people and goes to swell the sum of our national wealth. Thus, it will be seen that, formerly, the American consumer paid *very nearly twice as much for the service*, and enriched the British capitalist; whereas, at present, he not only saves *one half of the former cost of freight to himself* but, in paying the remaining half, benefits his fellow citizen, who in return aids in consuming perhaps the very merchandise which he has imported.

"Under these circumstances, can any reasonable man doubt the propriety, even in a pecuniary point of view, of sustaining the

present system, which, at its very commencement, has given such ample proofs of its usefulness? Your Committee think not, and do not hesitate to give it as their opinion that, *merely as a matter of dollars and cents*, the service in question should be liberally sustained by Congress, and will in the end make ample returns.

"But your Committee regard this proposition as one, the mere money feature of which is of minor consequence, when brought into comparison with other more important considerations. The question is no longer whether certain individuals shall be saved from loss or enabled to make fortunes, but whether the *American* shall succumb to the British lines, and Great Britain be again permitted to monopolize ocean mail steam transportation, not only between Europe and America, but throughout the world. We are aspiring to the first place among the nations of the earth, in a commercial point of view—a place which belongs to us as a matter of right—and are we to suffer ourselves to be overcome by British commercial capitalists under the auspices of the British crown? Shall it be said that, at the very moment when our steamships are admitted to excel those of any other people on the face of the globe, our enterprising citizens have been forced to relinquish the proud position they have attained, for the want of a few thousands of dollars, when the national treasury is full to overflowing? Let this end be attained and our great commercial rival

will have postages and freights all her own way, while we shall be compelled to contribute, as heretofore, to her undisputed supremacy.

"With a view to a full and fair understanding of this important subject, your Committee have communicated, through their Chairman, with the Executive Departments of the Government and the presidents of the various companies engaged in carrying the ocean mail by steam, and will now proceed to lay before the Senate the results of their careful inquiries. It may not be improper here again to note, by way of illustration, the benefits to be derived from ocean steam mail transportation, when in successful operation, as manifested in the case of the British Cunard line, under the auspices of the British Government. During the first six years of its existence, the line above named received from the Government no less than $2,550,000, while the Government received from the Company, in the form of postages, the enormous sum of $7,836,800, or $5,826,800 net revenue.

"The Government has paid to the line, (the Collins,) for mail service, in the two years, $770,000, and has received from the line $513,546.80. If the receipts be deducted from the outlay, the balance against the Government is $256,453.20 for the whole time, or $128,226.60 per annum.

"Thus it appears, that from a fair statement of the account current between the line and

> the Government, the latter is out of pocket, at the end of the two first years of the undertaking and under circumstances the most disadvantageous to the line, $256,453.20, or in other words, has paid $128,226.60 per annum, for carrying the ocean mail by steam over about six thousand miles of the greatest commercial thoroughfare in the world, for which, as yet, it has received nothing in return. But your Committee would ask, what has *the country* received in return for this $256,453.20? They will furnish the answer. The country has received through the proprietors of this line, in the form of freights and passage money, a no less amount than $1,979,760.85, in cash; and, if the reduction in the prices of freight formerly paid to the British line be taken into account, nearly as much more, by saving the difference in freights and passage money, to say nothing of the general advantages derived by all of our producing interests from the existence of this American line, which, as your Committee believe, are incalculable. The money account will then stand as follows: Government debtor to $256,453.80; Country creditor to $1,979,760.85 *in cash*; and if the former be deducted from the latter, the balance in favor of the country will stand $1,723,307.05, *in cash alone*, leaving out of view the duties on increased importations caused by the establishment of the American line."

Speaking of the Pacific Mail Steam Company, the

Report says:

"It will be seen from the above, that the total cost of the six vessels which have been accepted by the officers whose duty it was to supervise them and decide whether they had been built in accordance with the requisitions of the law and terms of the contract, and whose decision is presumed, by your Committee, to be conclusive in the premises, has been $1,555,069, and that their aggregate tonnage is 7,365 tons, instead of 5,200 tons, the amount agreed for. In addition to these ships, as your Committee are informed, the company has in the Pacific seven steamers, with an aggregate tonnage of five thousand tons, not yet accepted by the Government. The additional steamers are, and have been, always kept ready to replace the mail steamers in the event of detention. The cost of these additional steamers has been, it is stated, about two thirds of that of the accepted steamers of the same class, say about $1,036,712, making in all an outlay for steamships alone, of $2,518,337.

"It appears that the whole number of passengers, of all classes, transported by the Pacific Mail Ship Company, the line in question, previously to December 31, 1851, from Panama northward, has been 17,016, and from Oregon southward, 13,332. The prices of passage have constantly fluctuated, but, on the date above named, the 31st of December, 1851, the average rates were, for the first cabin, two hundred and twenty-two

dollars; second cabin, one hundred and sixty dollars, and steerage, one hundred and seven dollars, between Panama and San Francisco. In the early stages of emigration the prices were increased in consequence of the enormous prices of labor and supplies on that comparatively unsettled coast, but were subsequently reduced. At the commencement of the undertaking, the Company incurred, of necessity, vast expenses in the selection of proper harbors for taking in provisions, water, coal, etc., and in the construction of *dépôts*; and even at present, coal and supplies of every description are sent to the Pacific *viâ* Cape Horn, a distance of from thirteen thousand to fifteen thousand miles.

"The freights from Panama northward, have been small in amount, and confined to the lighter descriptions of articles sent by express, while the mails have been very large, amounting in some instances to one hundred and fifty bags, each, and, together with coal, water, etc., occupying all of the space not required for passengers. From California, the freights southward, have consisted of treasure, amounting, it is supposed, to the value of seventy millions of dollars, but it is extremely difficult to compute the worth accurately, as a large portion of the gold, etc., sent has been in the possession of passengers, and the value does not appear in the manifests."

In noticing the Panamá Railroad and the California lines, the Report says:

"Nearly two millions of dollars have already, as your Committee are informed, been expended on this important work, by a company possessed of ample means, and the completion of it can not fail to open the way for a vast commerce, between the Atlantic and Pacific oceans, and at the same time cause our fellow-citizens in California and Oregon no longer to be regarded as exiles. This road being once opened, the passage of the Isthmus, now so much dreaded, will be effected with perfect ease and comfort in a couple of hours, instead of two or three days, as at present, and families, instead of individuals, will be enabled to seek homes in the fertile valleys of our possessions on the Pacific coast. The value of the lines of ocean steamers, of which your Committee have been speaking, to the commercial and other great interests of our country and the world at large, can not well be estimated until this road shall have been finished and put into full operation. When such shall be the case, the trade between California and Oregon, as well as that of China and the islands of the Pacific and Indian oceans and the Atlantic States and Europe, which now passes around Cape Horn, a distance of some fifteen thousand miles, will be enabled to take a direct course across the Isthmus of Panama, the passage of which will require but two or three hours. The United States mail, from San Francisco to New York, has already been transported within the space of twenty-five days and eighteen hours, a day less than the time claimed to have been taken by any

other route, at a period, too, when there were but seven or eight miles of the road in operation. On a late occasion, five hundred government troops were sent to California by this route, and were placed at the point of their destination in a little more than thirty-five days, without any serious desertion or accident of any kind. A similar operation by the way of Cape Horn would have occupied six months at least. The store-ship Lexington, which sailed from New-York for San Francisco, during the last year, arrived at the latter place on the last day of February, 1852, after a passage of *seven months and one day*. In a country the military establishment of which is so small as that of the United States, facilities of concentrating troops at points distant from each other, in a short time, are of incalculable value, and may be said to add manifold to the efficiency of the military force.

"From what has been already said, it will be seen that the Pacific Mail Steamship Company, independently of the associate line on this side of the Isthmus, and without taking into view the cost of the railroad, has expended in the construction of mail steamers alone $2,518,337; and if to this be added $2,606,440.45, the expense incurred for a similar purpose by the Company on the Atlantic side of the Isthmus, the entire cost of steamships, to the two companies engaged in the transportation of the California and Oregon mails, has been $5,124,777.

"It is no more than sheer justice that your

Committee should state that the California lines, east as well as west of the Isthmus of Panama, have proved themselves worthy in all respects of the confidence of the country. In no single instance has an accident occurred involving loss of life or serious injury in any way to the travelling public. Such is the strength of the vessels employed, that on two several occasion when, owing to dense fogs and under-currents, cooperating with the defectiveness of the charts of the Pacific coast, one of the ships of the Aspinwall line struck, at one time, upon a soft bottom, and, at another, upon a hard sandy bar, she was steamed off, after thumping, without the slightest injury whatever. Facts such as these are the more important, inasmuch as several steamers have lately been lost on the same coast with a great sacrifice of human life, evidently owing to a want of the strength necessary to resist, effectually, the force of the winds and waves. In the opinion of your Committee, the security afforded to travellers by the strong fastenings and heavy timbers of the ocean mail steamers, built as they are, under the supervision of naval officers, who are selected on account of their thorough acquaintance with and experience in such matters, and made capable of sustaining heavy armaments, is a matter of the greatest moment. Experience has shown that, in the race after gain, our countrymen are, perhaps, more regardless of risk to human life than the people of any other country in the world. Scarcely a day passes without fresh

evidences of the truth of this proposition. The river, as well as the sea-going steamers, are generally built with reference to speed and lightness, coupled with smallness of draft of water, and hence, in case of touching the ground, or of violent storms, it is found that if one portion of the frame gives way, the breaking up of the entire structure follows with a rapidity that is but too well calculated to show the slight manner in which these vessels are constructed. Your Committee think that the additional expenditure of a few hundreds of thousands of dollars is a matter not worthy of consideration, when brought into comparison with the loss of life, and would rather see even millions devoted to the construction of *strong steamers*, than witness the sudden and heart-rending ruptures of the dearest ties of our nature, caused by the accidents that so frequently occur. Such is their feeling of stern disapprobation of the reckless indifference respecting the safety of passengers, daily manifested by some of the proprietors and officers of steam lines, that they are resolved, so far at least as they are concerned, not in any way to countenance, directly or indirectly, such a course of proceeding. In the extension of the system of ocean mail transportation which they propose to recommend, care will be taken, that the steamers which carry the Government mails shall be regarded as national ships, to a certain extent, and as such, under the charge of the law-making power, and be so built as to secure safety to

> travellers; and that, in all contracts, this consideration shall be regarded as one of paramount importance."

Regarding a few sailing-ship owners in New-York and Boston, who had memorialized Congress against the Collins and other lines, the Report says:

> "The memorialists are loud in their complaints respecting the alleged improper interference of the Government with matters that should be left, as they say, entirely to individual enterprise, which in their opinion becomes paralyzed under the effects of Government patronage bestowed upon some to the exclusion of others. If the authors of this memorial will take a fair and dispassionate view of the matter, they will, as your Committee think, be convinced that they are wrong in their supposition, and that the Government has not gratuitously meddled in concerns with which it should have nothing to do. The merchants and ship-owners referred to seem to forget, in the first place, that the system of ocean steam mail navigation is intended to secure adequate protection for our commerce from foreign aggression in the event of war; and in the second, that it was instituted at a moment when the fine packet ships, to which the memorialists refer with such becoming pride, had in fact been driven from the ocean to a certain extent by the overwhelming power of a British mail steam line, sustained by the British Government, which had monopolized ocean mail and passenger steam transportation, as well as the freights of

lighter and more perishable descriptions of merchandise. If, as these gentlemen have stated, the sailing ships have been made to succumb, it has been under the force of an agency more certain and not less powerful than the one named by them—wielded by foreign capitalists and directed by a foreign government claiming for itself the supremacy of the ocean. The Cunard line of ocean steamers had been in possession of a monopoly of freights, letter postage, and passage money for years, in despite of the attempts of the memorialists to resist, successfully, before the Government of the United States, seeing that American interests were made tributary to foreign capital, aided by a foreign government, adopted the wise course of correcting the evil by kindred means, and placing, at least, to a certain extent, American interests under the auspices of American intelligence and enterprise. What would have been the condition of the New-York lines and other ships had not the Government of the United States thought proper to extend its aid to the establishment of the Collins line? Would it have been any better than at present? or rather would it not have been infinitely worse? Had the Cunard line continued to prosper, as it must have done in the natural course of things, would it not in all probability have increased its number of ships until it would have monopolized every description of ocean transportation? Would not the trade with the United States have been entirely carried on in British steamers, navigated at small

expense, and therefore able to do the carrying trade at low prices? Again, what would have been the condition of the Southern coasting business, so far as mails, passengers, and light freights, at least, are concerned, had the fourteen British steamers then employed been permitted to operate, unchecked by the American line of mail steamers, between New-York and Chagres? Would it not have been entirely at the mercy of the commissioned agents of the British crown, who so well know how to avail themselves of opportunities to promote their own interests by advancing those of their government? To carry the inquiry further, what would have been the condition of our possessions on the Pacific coast, visited as they would have been by British steamers—for where is the spot on the inhabited or inhabitable globe to which they do not bear the union jack of old England—had not the Aspinwall line been established? Such is the universal pervasion of the money power in British hands, that at present, as is well known, the Cunard line has extended a branch to Havre, to transport goods to England almost free of cost, with a view to appropriate to itself the freights from that quarter, and thus not only crush the American line of steamers to Havre, but be enabled to underbid the Collins line, and, if possible, again monopolize the trade with the United States over that route. Would all this have raised the prices of freights in American sailing vessels, and given an advantage to the memorialists in question,

who had at one time monopolized to themselves the freights, postage, and passage money in sailing ships? or would not, on the contrary, such a state of things have operated so to give a British tendency to trade everywhere, and to furnish freights to British ships, at prices at which the American ship owners could not afford to navigate their vessels?

"What, the Committee would ask, has the Government of the United States done in the premises? Having under its charge the control and direction of the United States mails upon land and sea, it has thought proper to say that it would pay for the transportation of the mails in *American steamers*, which can, if necessary, be converted, at a small expense, into war steamers, and adopted, if need be, into the navy proper, at an appraised value, and thereby become efficient protectors of American commerce in the event of a war. This is the head and front of the Government's offending, and has, forsooth, aroused the ire of the commercial monopolists of New-York, Boston, and elsewhere, because they can not any longer enjoy the gains which, for more than a quarter of a century, they had wrested from the mass of consumers throughout the land, north, south, east, and west. Your Committee must say that, in their opinion, such complaints come with a bad grace from such quarters, and it is to be feared that victorious steam will ere long, without the aid of the

> Federal Government, supersede the sailing ships of the memorialists, through the instrumentality of the discoveries daily in progress, whereby the navigation of vessels propelled by that power will be made a matter of comparatively small cost."

Speaking of steam communication with Pará and Rio de Janeiro, the Report further says:

> "When the almost unbounded capacity for trade of the basins of the La Plata and Amazon is taken into view, embracing as it does a great variety of useful products which may be advantageously exchanged for the manufactures and agricultural productions of our own country, the mind is at a loss what limit to assign to the trade to which civilization and the extension of commercial facilities must eventually give rise. Nor are the advantages of this great prospective commerce to be confined to the immediate intercourse between this country and the regions to which we refer. While the prevalence of certain winds, and the form of the coast of South-America, are favorable to a direct trade with the continent of North-America, they are such as to compel the commerce with Europe to pass along our shores, and thus constitute our Atlantic seaports so many stopping places at which the ships of the old world may touch in their voyages to and fro. Heretofore the policy of the governments which occupy the regions watered by the La Plata and the Amazon, and their respective tributaries, has been so exclusive in its character as to trammel, if

not entirely prevent, their intercourse with distant nations. The different sovereignties which have sprung into existence since South-America became independent of European control, have been so jealous of each other that they have appeared to try which should be most succesful in expelling foreign commerce, lest it might bring to some one of them benefits which others did not and could not possess. A wiser policy, however, appears to be about to prevail since the fall of Rosas, and there is good reason to believe that, hereafter, the commerce of those communities with the rest of the world, will be placed upon a more liberal foundation. Should such be the case, Rio de Janeiro can not fail to become the great centre of a largely increased trade in the southern hemisphere."

"Should it be preferred to limit the extent of the American line to Para, at the mouth of the Amazon, the largest river in the world, there is at present a Brazilian line between that point and Rio de Janeiro, which, with the lines between Rio and the mouth of the La Plata, will render the connection complete.

"Of the Amazon, it is proper to state that it is navigable by the largest vessels, and presents a line of shore of not less than six thousand miles, abounding in every description of product, with climates of all temperatures and soils adapted to all sorts of vegetable growth. As the regions through which this vast river passes are peopled by communities

to which manufacturing is unknown, it will at once be seen what an immense market will be opened to American industry in the various departments of the useful arts. The proposed connection would, together with the intercourse by steam, which will inevitably be established on the Amazon, draw to that river the trade of the interior, which at present passes over the Andes on the backs of sheep and mules to the Pacific ocean, and constitutes a large portion of the commodities that are transported around Cape Horn. With a view to this river navigation, Brazil has already entered into a boundary treaty with Peru, by which she has engaged to establish steamboat navigation on the Peruvian tributaries of the Amazon, and is preparing to put seven steamers upon the river, where none have heretofore been.

"The experience of the world has shown that nations do not become commercial or manufacturing, so long as the products of the soil are sufficiently abundant to yield them wealth; and, hence, it may be reasonably inferred that the carrying trade to and from South-America will, if proper measures be taken, fall into the hands of American ship-owners. By way of ascertaining what the extent of this trade will be, if reference be had to the interior or back country as the standard of the commercial resources furnished by rivers, it will be found that the total area drained by the rivers of the world is as follows:

	Sq. Miles.
Europe, emptying into the Atlantic,	532,940
Africa, emptying into the Mediterranean,	198,630
Total Old World,	1,731,570
Asia, emptying into the Pacific,	1,767,280
Asia, emptying into the Indian ocean,	1,661,760
Total Asiatic,	3,429,040
North-America, including St. Lawrence and Mississippi emptying into the Atlantic,	1,476,800
South-America, emptying into the Atlantic—	
Amazon and its confluents,	2,048,480
La Plata and all others,	1,329,490
Total South-American	3,377,970
Total American to the Atlantic,	4,854,770

"From the above statement it will be seen that the proposed line of steam communication will bring within thirty days of each other, the commercial outlets of navigable streams which drain a back country greater in extent than that which is drained by all of the navigable streams which empty themselves into the Atlantic, the Pacific, and the Indian oceans, from those portions of Europe, Asia, and Africa, which are accessible to American commerce. Settlement and cultivation will, in the course of time, make these American river basins as

rich in products as those of the old world.

"The question next arises, who are to be the carriers of the trade which is hereafter to spring out of these American river basins, the English or the Americans? If Great Britain be suffered to monopolize commerce as she has heretofore done by her steam navigation, her people will enjoy this great boon; but if, on the contrary, the United States take advantage of circumstances as they should, the prize will be won by Americans."

"Your Committee would remark, in concluding this Report, that, regarding as they do the existence and rapid extension of the system of ocean mail steam navigation, as absolutely essential to the dignity and permanent prosperity of the country, and as the only means, consistent with the genius and policy of our free institutions, of acquiring a maritime strength, which, by keeping pace with the improvements of the age, shall place us upon an equal footing with other civilized countries of the world, without the necessity of an overgrown and expensive naval establishment proper, in time of peace, they would feel themselves derelict in the performance of their duties, did they not recommend the measure, with the earnestness which its importance demands.

"Circumstances indicate, with a clearness not to be misunderstood, that in any future struggle for superiority on the ocean, the contest will be decided by the power of

steam. With a view to this result, England has applied herself with even more than her wonted energy to the construction of a regular steam navy which shall be superior to all others. The number of ships which Great Britain has of this kind, is at present two hundred and seventy-one, and there are no less than nine royal war steamers in progress of construction, to say nothing of the mail and other steamers which are being built. The course thus pursued by the great commercial rival of the United States, renders a corresponding energy and activity on our part absolutely necessary, in a national point of view; a steam navy must be provided for future emergencies in the way proposed by the Committee, or war steamers must be built at an enormous outlay of public money and kept ready in the navy yards, or in commission, at an expense which is appalling to every lover of judicious economy, or the stripes and stars of our country, which have heretofore floated so triumphantly on every sea, must grow dim, not only before the 'meteor flag of England,' but the standards of the secondary powers of Europe. If members of Congress are prepared to adopt either of these latter two alternatives, let them say so, and let a system which promises, under an honest and faithful discharge of duty on the part of the executive branch of the Government, to realize the most sanguine expectations of its friends, be at once abandoned. Let Great Britain be again the guardian of our commercial interests and the beneficiary of American

trade. Let the Liverpool, Bremen, Havre, California, and other lines, which have furnished twenty-four as noble sea steamers as ever floated, be abandoned to their fate, and let the Cunard line and other British steam mail lines and royal steamers supply their places on the Atlantic and Pacific oceans, and our Southern seas.

"Your Committee would again repeat that the question to be considered is not one of mere dollars and cents, or whether certain individuals are to be sustained, or not, but one of infinitely greater consequence—whether this proud republic shall now and hereafter exist as a power competent to maintain her rights upon the ocean. The present condition of political affairs in Europe is such as, in the opinion of many, to threaten a general war among the nations of that quarter of the globe, and the United States should stand ready, and able too, to protect the rights of her citizens upon the ocean, in such an event. Were such a crisis to take place to-morrow, or the next year, or within the next five years, is the country prepared for it? The steam navy proper amounts to sixteen steamers of all classes, which, together with the twenty-four ocean mail steamers in the employ of the Post Office Department, would give us a steam naval force not exceeding forty in all. Is this the position we should occupy, while Great Britain has at command upwards of three hundred war and mail steamers? France has, it is believed, upwards of a hundred, and the

> secondary powers of Europe have naval steam armaments in proportion, most of them exceeding our own. This question will be decided by the continuation or rejection of the system under consideration, which, with all the difficulties attendant upon new enterprises and under the most embarrassing circumstances, has gone very far to sustain itself, and promises, at no distant period, to become a source of large revenue to the Government, and incalculable commercial advantages, pecuniarily and otherwise, to the country."

The following is copied from the Report made by Mr. Rusk in 1850, and published in Special Report of the Secretary of the Navy, 1852. Speaking of the services of the mail steamers in our system of defenses, the Report says:

> "The truth is, that, in the opinion of your Committee, the temper of the times requires that we shall keep pace with the rapid improvements of other nations in their commercial and military marine, and that the only choice is, whether it is to be done by constructing vessels for the packet service, at a boundless expense to the Government, or by aiding private enterprise, and thus not only eventually avoiding expense, but adding largely to the revenues of the country. It will be seen from the above extract from Mr. King's speech, that, in the course of five years, the balance in favor of the Government from the Cunard line alone was $5,286,000. The New-York and Liverpool and Bremen lines will come in for

a large, if not by far the greater, share of the postage and freightage heretofore enjoyed by the Cunard line; and the line to Chagres, for the advantages that have, up to the time of its partial commencement, been in the exclusive possession of the British packet establishment in that direction. Nor are the freightage and postage moneys the only sources of profit. In proportion to the increase of these facilities will be the extension of trade, and consequently the Government will receive the duties payable upon all foreign merchandise brought into the country. Besides, persons *in transitu* will leave much money in our cities and along their routes, to say nothing of the porterage and costs of transportation of goods. To benefit our people is to benefit our Government; as the more we enrich the former, the more able are they to contribute to the support of the latter.

"To construct ships and keep them in our navy-yards, subject to the injuries of time and casualties, does not consist with the notions of the American people, on the score of economy; nor is it in accordance with received opinions in regard to the propriety of placing excessive patronage in the hands of the General Government. At the same time, it is in perfect unison with the spirit of our free institutions that the arts of peace shall be made tributary to the purposes of defense, and the same energies which extend the commerce and manufactures of our country shall, in the event of necessity, be

capable of being made use of for our protection. While the crowned heads of the Old World keep in constant pay vast armies and navies sustained by the heart's blood of the oppressed people, for the protection and preservation of their unhallowed power, it is the proud boast of our country that our soldiers are our citizens, and the sailors, who, in time of peace, spread the canvas of our commercial marine throughout the world, are the men who, in time of war, have heretofore directed, and will continue to direct, our cannon against our foes."

"The simple fact that the ships employed in it [the mail service] *may hereafter, if the Government thinks proper*, be purchased and commissioned as regular war steamers, to be officered and manned as ships of war, should not and can not prevent the construction of steam or sailing vessels for ordinary naval purposes. Your Committee are of opinion that, so far from being an impediment to the proper increase of the Navy, the prosperity of the ocean steam packet service must operate in favor of an enlargement of the naval force, the necessity for which is increased in proportion to the extension of our commercial relations with foreign countries. The routes upon which lines of steam packets can be sustained and made profitable to the owners are comparatively few, when we take into view the infinitely diversified ramifications of trade. Great Britain, with her vast colonial and general commerce, had, in 1848, but fifteen lines in

which national or contract vessels were employed, including the home stations, as they are called, or points of connection between the British islands. Nor has the ocean steam packet system hindered, in the slightest degree, her progress in the construction of steam or sailing vessels for the naval service. In speaking of steam vessels available for naval service, Captain W. H. Hall, of the British Navy, in the course of his examination before the special Committee of the House of Commons, hereinbefore referred to, says: 'I some time ago sent to the Admiralty a plan for making the whole of the merchant steamers available in case of need; and if there were an Act of Parliament that these ships should be strengthened forward and aft to carry guns, it might be then done with a very trifling expense; that would give this country more power than any other country in the world. We have nearly one thousand steam vessels, half of which, at least, might be made available in case Government required their services. Our mercantile steamers are some of the finest in the world, and five hundred of them might be turned to account. They should all be numbered and classed, so that Government would merely have to ask for the number of vessels they wanted, when they might go to Woolwich, or other places, and put the guns on board, and then they would be ready for service.'

"Here is the opinion of a *captain in the British Navy* with reference to the availability of

steam vessels for national defense; and what a lesson does it teach to us in America, where steam navigation is found penetrating every portion of the Union, and spreading itself on our maritime and lake frontier in every direction! Here is found no expression of apprehension lest the mercantile steamers might interfere with the growth or efficiency of the Navy to which the witness belonged. This opinion, moreover, is expressed in a country where, according to the testimony before the Committee already named, there were, in 1848, 174 *war steamers, with an aggregate horse-power of* 44,480 *horses*; and where Mr. Alexander Gordon states, in a letter addressed to the same Committee, the Steam Navy had then cost the country £6,000,000 sterling, or $30,000,000, '*exclusive of all reïnstatements and expenses during commission*;' the same gentleman also alleging that the annual repairs amounted

to	£108,000
Annual cost for coals,	110,000
Depreciation at a moderate allowance,	600,000
Making the total amount of annual cost,	£818,000
Or	$4,094,000

"The regular employment of the best engineers on board of contract vessels, and the great experience they would acquire from being constantly on active duty, would furnish to the naval service, in the event of a war, a corps that would be invaluable. In

> speaking of the superiority of the engineers on board of contract vessels in the employ of the British Government over those on board of the Queen's ships, a witness before the select Committee of the House of Commons says: 'Last year there was a universal complaint of the inferiority of the engineers and all persons connected with steam employed in her Majesty's service. It was explained, and very easily explained, by the superior advantages in the merchant service, and particularly the high wages paid. In all contract steam packets, they have men on board the vessels who are competent to superintend any alterations or repairs in the machinery which may be required.'"

Secretary Graham said on this subject to the Senate Committee, 20 March, 1853:

> "While their discussions [mail steamers] justify the conclusion that vessels of this description can not be relied on to supersede those modelled and built only for purposes of war, it is respectfully suggested that a limited number of them, employed in time of peace in the transportation of the mails, would be found a most useful resource of the Government on the breaking out of war.
>
> "If conforming to the standards required by these contracts, their readiness to be used at the shortest notice, their capacity as transports for troops and munitions of war, and their great celerity of motion, enabling them to overhaul merchantmen, and at the same time escape cruisers, would render

> them terrible as guerrillas of the ocean, if fitted with such armaments as could be readily put upon them in their present condition."

Post Master General Collamer also said on this subject, June 27, 1850:

> "There are three modes which have been mentioned of transporting the mail. The first is by naval steamships, conducted by the Navy, as a national service. This will occasion so enormous an expense that it is not probable the project will be entertained.
>
> "The next mode suggested is the sending the mails, from time to time, by the fastest steamers which are first going. This has one advantage: it gives occasional aid to the enterprising; but there are many and great objections to it:
>
> "1st. It is entirely inconsistent with fixed periods of departure and arrival.
>
> "2d. It makes all connections on or with the route uncertain.
>
> "3d. A price must be fixed, to prevent undue exactions of the Government; and yet no one would be under obligation to take the mail at the price, so that it would be uncertain of going at all.
>
> "4th. It would be impracticable to send agents with all those mails, to take care of them and make distributions, except at an

enormous cost.

"5th. There would be constant difficulty with slow and unsafe boats.

"6th. The great object of obtaining steamships, so constructed, under the inspection of the Navy Department, as to be suitable for war vessels, and subject to exclusive appropriation and use as such, would be sacrificed.

"The third project is the making of contracts, for a stated term of years, *upon proposals advertised for in the ordinary method adopted for mail-coach service*. This would not answer for ocean steam service, unless provision were made for security, in the strength, capacity, and adaptation of the vessels, with their machinery, etc."

Regarding our steam service in the Gulf, and in reviewing the contract made by the United States Mail Steamship Company, the Hon. Edwin Croswell, and associates, in a letter to the Chairman of the Senate Postal Committee, presented the following important reflections:

"As early as the year 1835, the attention of the British Government was directed to the plan of changing the mode of conveying the mails by the ships of the East-India Company and the Government, and adopting the contract system with individuals and companies, with a view to combining the essential properties of a naval and commercial steam marine.

"In consequence of the Report of the Commissioners appointed by Parliament to inquire into the management of the English Post Office Department in 1836, the mail steam packet service was transferred to the Admiralty. The Report stated the conviction of the Commissioners of Inquiry that 'the advantages which a System of contract must generally secure to the public over one of the establishment, however well conducted, were such that they wish they could have felt justified in recommending that it should be universally and immediately adopted.'

"The Secretary of the Admiralty stated that, 'in acting upon this opinion, the Admiralty entered into contracts for conveying the mails by steam vessels to and from Spain and Portugal, and subsequently between Alexandria and England, with the Peninsular and Oriental Steam Navigation Company. Contracts were also entered into for the conveyance of the mails between England and North-America, and England and the West-Indies and Mexico.' That 'the execution of all these contracts, with the exception of the latter, had given general satisfaction. But for this exception, the extent and complication of the plan at its commencement afforded some apology.' That 'the spirit in which the steam contractors had generally executed their contracts merited notice, as they had in almost every instance exceeded the horse-power stipulated in their agreements, and thus insured an accuracy in the delivery of mails which experience has

shown, if the letter of the contract had been adhered to by them, would not have been the case.' And that 'the contract system had been generally satisfactory to the Admiralty and the public, and had tended largely to increase the steam tonnage of this country, (England,) to encourage private enterprise in scientific discovery, and the regulation and economical management of steam.'

"Such, certainly, were among the valuable results of the system; but these were not the only considerations that led to its adoption. The English Government, with the forecast for which that far-reaching power is distinguished, saw the advantages which an extended steam marine would give to its commerce over that of every other nation in the world. It saw also the value of connecting this great branch of the national service with the commercial and practical skill of the country. It soon formed and matured its plan, embracing within its scope nearly the entire commercial world. Steam lines, as stated in the preceding extract from the Admiralty Report, were established, radiating from England to all the prominent European ports, to the Mediterranean, to Egypt, the East-Indies and China, the West-India Islands, South-America and Mexico, the ports in the Gulf of Mexico and Havana, the United States and the English colonial possessions in North-America, and to the islands and ports in the Pacific ocean. This vast chain of intercourse was not only completely established, but it became a

matter of national policy to enlarge, strengthen, and maintain it. By it much of the commerce of the world by steam, and nearly all the letter-carrying by steam between this continent and the European ports, and even the distant parts of our own territory, were engrossed by British ships."

"Important national considerations, aside from the design to engross for British bottoms and British capital the trade and intercourse of the commercial world, and especially with the American continent and islands, entered into the Government plan. It was ascertained to be a far less expensive mode of maintaining a naval steam force adapted to the purposes of Government, and to any emergency that might require these ships for other than mail purposes, than to build, equip, and keep in service national steamships of war. The experiment has proved its adequacy to the intended object; and it continues not only to receive the approval of the Admiralty and Government of England, but to be continually undergoing enlargement and expansion."

"The West-India mail steam line was proposed to the British Government in April, 1839, by sundry merchants of London. A charter was granted to the contractors in that year, under the title of the Royal Mail Steam Packet Company. It embraced the following routes:

"1. *Outward Atlantic Route.*—From Southampton to Madeira, Barbados and

Grenada—steamer, every 15 days.

"2. *Trinidad Route.*—From Grenada to Trinidad and Barbados—steamer, every 15 days.

"3. *Demarara Route.*—From Grenada to Courland Bay, (Tobago)—steamer, every 15 days.

"4. *Northern Islands Route.*—From Grenada to St. Vincent, St. Lucia, Martinique, Dominique, Guadalupe, Antigua, Montserrat, Nevis, St. Kitt's, Tortola, St. Thomas, and St. John's, (Porto Rico)—steamer, every 15 days.

"5. *Jamaica and Mexican Route.*—From Grenada to Jacmel, (Hayti,) Kingston, Havana, Vera Cruz, and Tampico—steamer, every 30 days.

"6. *Jamaica and St. Iago de Cuba Route.*—From Grenada to Jacmel, Kingston, St. Iago de Cuba, St. Juan's, (Porto Rico,) and St. Thomas—steamer, every 30 days.

"7. *Bermuda, Havana, and Jamaica Route.*—From St. Thomas to Bermuda, Nassau, Havana, Kingston, Jacmel, St. Juan's, and St. Thomas—steamer, every 30 days.

"8. *Homeward Fayal Route.*—From St. Thomas to Southampton—steamer, every 30 days.

"9. *Laguayra Route.*—From Grenada to Laguayra, Porto Cabello, and St. Thomas—steamer, every 30 days.

"10. *Panama and St. Iago de Cuba Route.*—From Kingston (Jamaica) to Santa Martha, Carthagena, Chagres, and St. Juan de Nicaragua—steamer, every 30 days.

"11. *Honduras Route.*—From Havana to Balize, (Honduras)—sailing schooner, every 30 days."

"The contract system, combining the efficient features of an extended commercial and Government steam marine, was thus adopted after full investigation on the subject by the Board of Admiralty, the Treasury, and the different Government Departments, including the Post Master General. The merits and benefits of this system have been tested by England. That Government was the first to engage in it, and, as we have already stated, fully approve, and are constantly extending it. The Committee of Inquiry of Parliament, as we have already quoted, say truly that it 'had tended largely to increase the steam tonnage of that country, to encourage private enterprise in scientific discovery, and the regulation and economical management of steam.' After an examination of it in the most scientific and practical manner, that Government regards it as altogether more economical for the nation, and for the general public interests, than the exclusive employment of Government vessels. The ships built by the contract companies have far exceeded in speed and other essential qualities the ships constructed by Government. A far greater amount of service was obtained, at a cost much less than would

be incurred by Government in building, equipping, manning, and running national vessels for even a partial performance of the same service. Individual and associated skill, enterprise, and capital were called into requisition, and, aided by Government means, contributed to enlarge, extend, and fortify the naval and commercial power of England.

"The practical operation of this great system of steam lines was to place within the reach of English vessels, of a semi-national character, and ready to be converted into ships of war, our entire Southern coast and harbors, besides yielding to them the foreign trade, commerce, and letter-carrying, by steam, to and from all parts of our country. To meet and counteract this state of things, became the object and duty of the American Congress and Government. It was the more obvious at that time particularly, engaged as we were in a war with Mexico, and our only means of coast defense of any force being a single steamer, and she not capable of entering the Southern harbors, while English steam fleets literally filled and occupied our waters. To counteract, so far as was demanded by the requirements of our own commerce, and the defense of our coast, a monopoly so formidable, which had grown up under the direct and liberal coöperation of the English Government, and the supposed superiority of English machinery, required the aid of Congress; for it was evident that unaided American enterprise and capital

> could not cope with it. Accordingly, at the close of the session of 1847, the Congress of the United States passed an act authorizing the Secretary of the Navy to contract with sundry parties and different steam lines for the construction of ocean steamships, as part of the plan of a combined naval and commercial steam marine, in connection with the mail service."

After enumerating the various lines established by Congress, he further says:

> "These (with the previously authorized line from New-York to Bremen) were the various parts of a complete and important plan adapted to the growing wants of the public service, and for providing an adequate steam marine, whenever the exigencies of the country might require it, and for facilitating intercourse and the transmission of the mails between remote parts of our own country and other nations. For the due performance of it in all its ramifications, it required a large aggregate of capital, skill, and intelligent enterprise. After a lapse of nearly three years, portions of the undertaking have gone into efficient operation; and already the fruits of it—its utility, and its advantages and benefits to the American government and people—have been demonstrated. When the various parts shall be completed, and the plan in all its features shall be in full operation, its immediate practical results, aside from its prospective effectiveness in furnishing a class of war steamers for any ultimate purpose of the American

Government, will be found fully to justify the action of Congress and the participation and favor of the Government, and confirm the public confidence in its great utility and value."

"When it came to the knowledge of the English government that Congress had entered into contracts establishing steam lines to Chagres, Havana, and New-Orleans, its first movement to counteract or discourage the proposed American line in that direction was to run branches of the Royal West-India mail line from Bermuda to New-York, and from Jamaica to New-Orleans and Mobile. Now that the American line to Chagres has gone into full operation, and the news from the Pacific comes by this line to New-York, and thence to Liverpool, some fifteen days sooner than the same news brought by the British line,[J] the English government has revised, enlarged, and extended its West-India line. It has entered into a new contract with the Royal Mail Steam-Packet Company, a material feature of which is to run a mail line direct from Southampton to St. Thomas, and thence to Chagres and back, twice a month, with steamers of larger capacity and power, and with a proposed speed of from twelve to fourteen miles per hour. For this line, five or six new steamships are, under the contract, to be built, while the old vessels are to form branches from this main line or trunk to other of the routes of this great and extended plan of steam intercourse and letter-carrying;

at the same time that government will withdraw its branches to the Balize, Mobile, and New-York, extend its line to Rio de Janeiro, and enlarge its line in the Pacific, from Panama to Valparaiso, converting it from a monthly to a semi-monthly route. These movements show not only the immediate results of American enterprise in ocean steamships, and the important consequences, aside from any purposes of coast and harbor defense, to which it has already led, but the strong public reasons on the part of our Government to foster, continue, and encourage it. It has already counteracted the best efforts of the large and long-established English steam lines, and transferred the commerce and letter-carrying so long exclusively enjoyed by them to American ships. If promoted and favored by the Congress of the United States, it will still meet and counteract the new efforts of the English Government to recover the ground which American skill, enterprise, and capital, aided by the Government, have won from them.

> [J] "By the contract of 1846 with the West-India Royal Mail Steam-Packet Company, the voyage from Chagres to Southampton is performed in 33 days. By the United States Mail Steamship Company the voyage from Chagres to New-York, and thence to Liverpool, is performed in 22 days.

"In relation to the comparative cost to the two governments by which these lines of

> ocean steamers, in connection with the naval and mail service, are maintained, it will be seen that the British Government pays as much for its single West-India and Chagres line as the American Government pays for all its lines—Liverpool and New-York, New-York and Bremen, New-York and Havre, New-York, Havana, New-Orleans, and Chagres, and Panama and San Francisco. The entire annual payments by the British Government amount [This was in 1850.—T.R.] to $3,180,000. Those by the American Government, when all its lines shall be in full service, will be $1,215,000. The British-West India Mail Steam-Packet Company are paid $3.08 per mile for mail service: the United States Mail Steamship Company, $1.88 per mile."

The Committee presented some few queries to Commodore M.C. Perry on the capabilities of the postal steamers for war purposes, to which he replies thus:

> "I now proceed to reply to the first division of the inquiry, as follows:
>
> "Question first: 'Whether the steamships employed in the transportation of the United States mail, under contract with the Navy Department, or any other steamships employed in the transportation of our foreign mails, are, in all respects, suitable for immediate conversion into steamers for war purposes, capable of carrying the armament or battery appropriate to the class specified in the contract?'

"In answer to the foregoing (first) question, I am of opinion that they are *not* 'in all respects suitable.'

"Question second: 'And if not suitable for such immediate conversion, whether they could be altered so as to make them efficient war steamers?'

"Answer: The following named Atlantic steamers maybe converted, by slight alteration, into war steamers of the first class:

"*Of Collins's line.* The Atlantic, Pacific, Arctic, and Baltic.

"*Of Law's line.* The Ohio, Georgia, and Illinois.

"*Of Mortimer Livingston's line.* The Humboldt and Franklin.

"*Pacific steamers—of Aspinwall's line.* First class, the Golden Gate. Second class, the Panama, Oregon, California, and Columbia.

"The foregoing vessels of the respective contracts are variously constructed as to materials, fastening, strength, and model.

"Question third: 'And if so, what alterations would be necessary to be made, and at what expense, to make them war steamers of the first class:'

"Answer: If these vessels had been originally constructed comformably to the *spirit*

(though it was not called for by the letter) of the contracts, as they should have been, and all English mail steamers now are, *in anticipation of their possible conversion, into war vessels*, the cost of converting them would be much less.

"Most of them were completed before I was ordered to their supervision; but I lost no time, after entering upon the duty, in calling the attention of the contractors to this important consideration, an observance of which would not have added more than one per cent upon the cost of construction.

"In altering these vessels so as to make them available for war purposes, the most simple, expeditious, and economical plan would be to razee them, or cut off their upper decks and cabins forward and abaft the wheel-houses; not by tearing them to pieces and defacing the costly ornamental work, which, though of no value to the Government, still need not be destroyed.

"The razeeing should be effected by sawing the top timbers, and cutting off by sections the whole of the upper dock, excepting the space between the wheel-houses, thus leaving the greater part of the main deck exposed and for the accommodation of the armament, and enough of the sides above that deck to answer for bulwarks and side-ports.

"Below, it would only be necessary to remove the state-rooms not wanted for the

accommodation of the officers, and convert the after-hold and fore and main orlops into magazines, store-rooms, shot and shell lockers, etc., etc.

"According to my calculation, the cost of the conversion of either of the before mentioned vessels, exclusive of armaments, repair of machinery and ordinary repair, would not, or certainly *ought* not, exceed, for steamers of the first class, $20,000, and for those of the second class, $15,000; and it could be readily done for this at any of our navy yards, provided that *useless* alterations were not made.

"It should be taken into view that those mail steamers, if called into service as war vessels, would be considered as forming an auxiliary force to the regularly constructed ships, and hence the impolicy of expending much money on them. The requisites of sound hulls and powerful engines, with efficient armaments, should alone be considered, leaving superfluous ornament out of the question.

"The armaments of the respective vessels would, of course, be a separate cost; and to arrange the guns on the upper deck, it would only be required to close up three or four of the hatches or sky-lights; to strengthen the deck by additional beams and stanchions; to cut ports, and construct the pivot and other carriages; probably it might be desirable to shift the capstan and cables.

"With respect to the description and weight of the respective armaments, I am clearly of opinion that the first-class steamers already named could easily carry each *four* 10-inch Paixhan guns on pivots, two forward and two aft, of the weight of those in the Mississippi; *ten* 8-inch Paixhans, as side-guns, ditto.

"The *second-class* steamers could with equal ease carry each *two* 8-inch Paixhans on pivots, one forward and one aft, and *six* 6-inch ditto, as side-guns.

"With the additional strengthening recommended, I am perfectly satisfied that the armaments suggested would not, in the least, incommode the vessels. Indeed, the weight of armament would be actually less than that which would be taken away by the removal of the upper decks and cabins, and the miscellaneous articles usually stowed on one or the other of two decks—such, for instance, as ice, of which not less than forty tons is generally packed in one mass; nor would the munitions and provisions required for the war vessel be of greater weight than the goods now carried as freight, saying nothing of the provisions and stores carried by the steamers for an average of 150 to 250 souls, including crew and passengers.

"It may again be remarked, that steamers thus brought into service would be far inferior to regularly constructed and appointed war vessels; yet in the general operations of a maritime war, they would render good service, and especially would

> they be useful, from their great speed, as dispatch vessels, and for the transportation of troops, always being capable of attack and defense, and of overhauling or escaping from an enemy."

Captain Skiddy, the Special Naval Constructor appointed by the Government to superintend the building of all the mail packets, says in a letter to Com. Perry:

> "In reply I will commence with the first-class ships, which are the 'Atlantic,' 'Pacific,' 'Baltic,' and 'Arctic,' of Collins' Liverpool line; the 'Franklin' and 'Humboldt' of Mortimer Livingston's Havre line.
>
> "These ships, although equal in strength, probably, to any steamships afloat, are not suitable for *immediate* war purposes, but can be made efficient in four or six weeks, capable of carrying the armament or battery of a first-class frigate—say four ten-inch guns and twelve eight-inch guns. These alterations would consist of a removal of the deck-houses, spar or upper deck, forward and abaft the paddle-wheel boxes, fitting the after and forward bulwarks in sections, cutting port-holes, fitting hammock cloths or nettings, putting in extra beams and knees, and stanchions, moving the windlass below, building magazines, shell-rooms, officers' rooms, etc., etc. The cost of all these alterations and fixtures would not exceed ($15,000 or $20,000) twenty thousand dollars each ship. These ships would then be relieved of about one hundred and fifty tons

weight, or nearly double the weight of guns and carriages, with less resistance to water and wind, adding an increase to their already great speed."

In the case of all these steamers, that is, of the Havre and Bremen, the Collins, the Aspinwall, and the Pacific lines, Commodore Perry reported that they "*were capable of being easily converted into war steamers of the first class*."

PAPER F.

OCEAN STEAM LINES OF THE WORLD.

LINE.	SERVICE.	Ships.	Tonnage.
Cunard, Paddle-wheel,	Liverpool, New-York, Boston, and Halifax,	8	12,000
Cunard, Screw,	Liverpool, New-York, Boston, and Halifax,	4	4,800
North Atlantic Steamship Co.,	St. John's and Portland,	3	4,800
European and American S. S. Co.,	Bremen, Antwerp, Southampton, & New-York,	4	10,000

European and American S. S. Co.,	Bremen, Antwerp, Southampton, to Brazil,	4	9,000
London and Canada,	London and Montreal,	2	1,870
Liverpool and Canadian,	Liverpool and Quebec,	4	5,000
Liv., Philadelphia, and New-York,	Liverpool and New-York,	4	8,700
Glasgow and New-York,	Glasgow and New-York,	3	6,200
Belgian Transatlantic,	Antwerp and New-York,	4	8,800
Belgian Transatlantic,	Antwerp and Brazil,	5	6,500
Hamburg and American,	Hamburg and New-York,	4	7,300
Hamburg and Brazilian,[K]	Hamburg and Rio de Janeiro,	2	4,500
Genoa and Brazilian,	Genoa, and Rio de Janeiro,	4	8,000
Royal Mail Co.,	Southampton, West-Indies, Central America, South-America,	18	21,510
Royal Mail Co.,	Southampton, Per., Rio, Bahia, and La Plata,	4	6,820
Pacific Steam Navigation Co.,	Panama to Valparaiso and intermediate,	7	5,719

Peninsular and Oriental Co.,	Portugal, Spain, Malta, Alexandria, East-Indies, China, and Australia,	39	49,416
Europ. and Australian Royal Mail Co.,	Southampton, Alexandria, Suez, and Sydney,	7	15,500
Australian Royal Mail Co.,	Transport and other,	4	7,800
Rotterdam and Mediterranean,	Rotterdam, Leghorn, and Trieste,	4	1,900
North of Europe Steam Navigation Co.,	African,	4	3,200
McIver's,	Liverpool and Mediterranean,	10	9,000
McIver's,	Liverpool and Havre,	2	2,000
Bibby's,	Liverpool and Mediterranean,	11	11,700
Fowler's,	Liverpool and Mediterranean,	6	7,500
Dixon's,	Liverpool and Mediterranean,	4	8,800
Liverpool and Australian,	Liverpool and Australia,	2	7,000
London and Australian,	London and Australia,	4	7,500

African,	London, Liverpool, and Africa,	5	5,000
Union Screw Co.,	Southampton and Cape Good Hope,	3	1,800
Luzo-Brazileira,	Lisbon and Brazil,	4	8,000
Austrian Lloyds,	Very large Mediterranean service,	—	Unknown
Messageries Impériales,	Mediterranean, Black Sea, Levant,	50	Unknown[1]
W. Hartlepool Steam Navigation Co.,	Hartlepool, Hamburg, and St. Petersburg,	6	Unknown
Danube Steam Navigation Co.,	Vienna, Galatz, and Constantinople,	6	Unknown
Hamburg and Spanish,	Hamburg, Southampton, and all Spanish ports,	2	2,000
East-India Company,	Suez and India, and the Bombay Mail lines,	12	11,471
Spanish and Cuban,	Cadiz, Havana, and Mexico,	5	9,000
Companhia Brazileira,	Rio de Janeiro to the Amazon and La Plata,	7	5,500
Collins Company,	New-York and Liverpool,	3	9,727

Havre Steam Navigation Co.,	New-York, Southampton, and Havre,	2	4,548
Cornelius Vanderbilt,	New-York, Southampton, and Bremen,	3	6,523
United States Mail Steamship Co.,	New-York, Havana, Aspinwall, & New-Orleans,	6	8,544
Pacific Mail Steamship Co.,	Panamá, California, and Oregon,	13	16,421
New-York and New-Orleans,	New-York, Havana, and New-Orleans,	2	3,198
New-York and Alabama,	New-York, Havana, and Mobile,	1	1,300
Charleston and Havana,	Charleston, Key West, and Havana,	1	1,115
Savannah Steamship Co.,	New-York and Savannah,	4	4,793
New-York and Charleston St. S. Co.,	New-York and Charleston,	4	4,680
New-York and Virginia,	New-York Norfolk, and Richmond,	2	2,371
Philadelphia and Savannah,	Philadelphia and Savannah,	2	2,600
Boston and Baltimore,	Boston and Baltimore,	2	1,600
Texas Steamship Co.,	New-Orleans and Galveston,	4	2,400

Southern Steamship Co.,	New-Orleans and Key West,	2	1,000
Mexican Steamship Co.,	New-Orleans, Tampico and Vera Cruz,	1	960

[K] Building another steamer of 2,500 tons for the Brazil line.

[L] These vessels average about 250 horses' power each. Their tonnage is large, probably 1,200 tons each.

There are several other lines of ocean steamers in Europe; but it is almost impossible to ascertain anything definite about them. The list above embraces all of the most important companies of the world. The lines are continually changing, while the vessels are passing into new hands almost every week.

PAPER G.

The following official letter from Hon. Horatio King explains itself.

}POST-OFFICE DEPARTMENT,
WASHINGTON, NOV. 12, 1857.

SIR: In answer to your letter of 10th inst., I have to inform you, that the ocean mail steamship lines now under contract with the

Government for the conveyance of mails, are as follows, namely:

1. The New-York and Liverpool (Collins) Line, performing twenty round trips per annum, at an annual compensation of $385,000. Length of route, 3,100 miles.

2. The New-York and Bremen Line, *viâ* Southampton, performing thirteen round trips per annum, for the gross amount of United States postages, (sea and inland.) Length of route, 3,700 miles.

3. The New-York and Havre Line, *viâ* Southampton, performing thirteen round trips per annum for the gross amount of United States postages, (sea and inland.) Length of route, 3,270 miles.

4. The New-York, Havana, New-Orleans, and Aspinwall Line, performing twenty-four round trips per annum, at an annual compensation of $290,000. Length of routes 2,000 miles from New-York to Aspinwall *direct*; 2,000 miles from New-York to New-Orleans *viâ* Havana; and 1,200 miles from Havana to Aspinwall; making in all, 5,200 miles.

5. The Astoria, San Francisco, and Panama Line, performing twenty-four round trips per annum, at an annual compensation of $348,250. Length of route, 4,200 miles.

6. The Charleston, Savannah, Key West, and Havana Line, performing twenty-four round

trips per annum, at an annual compensation of $60,000. Length of route, 669 miles.

7. The New-Orleans and Vera Cruz Line, performing twenty-four round trips per annum, at $1,210.93 the round trip. Length of route, 900 miles.

The contracts on these lines expire as follows, namely:

New-York and Liverpool (Collins) Line,	27th April, 1860.
New-York and Bremen Line,	1st June, 1858.
New-York and Havre Line,	1st June, 1858.
New-York, New-Orleans, and Aspinwall Line,	1st Oct., 1859.
Astoria and Panama Line,	1st Oct., 1858.
Charleston and Havana Line,	30th June, 1859.
New-Orleans and Vera Cruz Line,	30th June, 1858.

I am very respectfully your obedient servant,

HORATIO KING.

To DR. THOMAS RAINEY.

PAPER H.

THE FRENCH, ENGLISH, AND AMERICAN NAVIES.

The following list is kindly furnished me by Hon. Wm. A. Harris, of Washington. The French list is taken from the "*Tableau General des Batiments a Voiles et a Vapeur composant les Flottes de la Marine Impériale Francaise.*"

SAILING VESSELS.

SHIPS OF 120 GUNS.—Ocean, Friedland, Ville de Paris, Valmy.

SHIPS OF 100 GUNS.—Hercule, Temmasses, Tage Turenne.

SHIPS OF 90 GUNS.—Jena, Suffren, Bayard, Breslau, Hector, Achille, Eole, Santi-Petri, Tilsitt, Sceptic, Castiglione.

SHIPS OF 86 GUNS.—Diademe, Neptune, Jupiter.

SHIPS OF 82 GUNS.—Marengo, Trident, Ville de Marsailles, Alger, Triton, Duperre, Genereux, Latour d'Auvergne, Saint-Louis.

FRIGATES OF 60 GUNS.—Iphigenie, Independante, Didon, Uranie, Belle-Poulle, Surveillante, Andromaque, Forte, Minerve, Melpomene, Perseverante, Renomme, Vengeance, Etrepienante, Victoire,

Semiramis, Guerrierre, Pallas, Semillante.

FRIGATES OF 52 GUNS.—Alceste, Calypso, Sirene, Atlante, Andromede, Nereide, Zenobie, Sybille.

FRIGATES OF 50 GUNS.—Reine Blanche, Cleopatre, Danae, Virginie, Poursuivante, Pandore, Nemesis, Bellonné, Amazone, Astrée, Junon, Hermione, Dryade, Circe, Flore.

FRIGATES OF 46 GUNS.—Thetis, Armide, Grigone, Margicienne, Africane, Penelope, Médee.

FRIGATES OF 40 GUNS.—Constitution, Psyche, Clorinde, Heliopolis, Jeanne d'Arc, Algerie, Resolue, Tiris, Ceres, Armorique.

CORVETTES OF 30 GUNS.—Ariane, Thisbe, Heroïne, Alemene, Embuscade, Sabine, Aventure, Favorite, Jeanne-Hochette, Corneline, Circe, Cybele.

CORVETTES OF 28 GUNS.—Arethuse, Bayonnaise, Arthemise, Galatée, Serieuse, Eurydice, Capricieuse, Constantine.

CORVETTES OF 24 GUNS.—Brillante, Naide, Creole, Danaide, Triomphante.

CORVETTES OF 20 GUNS.—Camille, Bergere, Iguala, Coquette, Echo.

CORVETTES OF 16 GUNS.—Diligente, Cornelie, Egle, Perle, Oritie.

CORVETTES OF 14 GUNS.—Astrolabe, Zélee, Prevoyante, Expeditive, Recherche, Active, Indienne, Sarcelle, Prudente, Indefatigable, Emulation.

BRIGS OF 20 GUNS.—Ducouedic, Palinure, Cygene, Alcibiade, Adonis, Hussard, Chasseur, Griffon, d'Hassar, Meleagre, Acteon, Bisson, Lapeirousse, Cassard, Oreste, Pylade, Nisus, Euryale, Beaumanvir, Chevert, Droupot, Alacryti, Voltigeur.

BRIGS OF 18 GUNS.—Mercure, Dragon, Faune, Genie, Faucon, Grenadier, Entreprenant, Fanfaron, Janus, Victor, Olivier, Zebre, Obligardo, Alerte, Cuirassier.

BRIGS OF 10 GUNS.—Volage, Surprise, Fleche, Alcyon, Comete, Sylphe, Dupetit-Lhouars, Bougainville, Argus, Fabert, Lutin, Cerf, Messaeer, Papillon, Rossignol, Agile, Geyer, Inconstant, Zephir, Railleur, Russee, Lynx.

BRIGS OF 8 GUNS.—Allouette, Alsacienne, Malouine, Tactique, Virgie, Eglantine, Panthere.

CORVETTES DE CHARGE 32 GUNS, 800 HORSE POWER.—Proserpine, Adour, Abondante, Oise, Caravane, Allier, Agathe, Fortune, Aube, Egerie, Rhin, Somme, Meurthe, Mosselle.

SLOOPS OF 28 GUNS, 600 TONS.—Perdrix, Loire, Provencale, Marsouin.

SLOOPS OF 20 GUNS, 550 TONS.—Robuste, Giraffe, Chandernagor, Cormoran.

SLOOPS OF 16 GUNS, 300 TONS.—Hecla, Dore, Cyclope, Vulcain, Lamproie, Volcan, Bucephale, Licome, Lezard, Mahe, Lionne.

SLOOPS OF 12 GUNS, 200 TONS.—Anna, Pintado, Menagere.

SLOOPS OF 8 GUNS, 150 TONS.—Pourvoyeur, Seudre.

SLOOPS OF 6 GUNS, 90 TONS.—Vigilant, Pilote, Ile d'Oleron, Mayottais.

SCHOONERS OF 6 GUNS.—Merange, Estafete, Gazelle, Hirondelle, Topaze, Beaucir, Euroquoise, Décidée, Jouvencelle, Tonguille, Amaranthe, Fauvette, Legere, Encelade, Etoile, Fine, Doris, Brestoise, Mouche, Bella Helene, Eugenie, Tafne, Parisienne, Gentille, Ibir, Mignonne, Souris, Egle, Iris, Papeiti, Sultan, Agathe, Touronnaise, Daphne, Levrette, Bose, Dorade.

CUTTERS OF 4 GUNS.—Rodeur, Furet, Moustique, Espeigle, Moutin, Favori, Levrier, Eperlan, Renard, Eclair, Goelund, Chamois, Emeraude, Esperance, Cupidon, Orglae, Aigle d'Or, Colibi, Antilope, Seybouse, Pluvier, Ecureuil, No. 1, Ecureuil, No. 2, Mirmidon, Capelan, Corvril, Boberach, Palmer, Belette, Colombe, Cigorle, Tafnal, Amiral, Papillon.

SAILING SHIPS CHANGED INTO STEAMSHIPS.

SHIPS OF 120 GUNS.—Montibello 650, Souverain 650, Desaix 650, Louis XIV. 650, Bretagne 960.

SHIPS OF 100 GUNS.—Fleurus 650, Ulm 650, Dugay-Etains 650, Annibal 650, Eyleau 650, Prince Jerome 650, Navarin 650, Austerlitz 650, Wagram 650, Massena 650.

SHIPS OF 90 GUNS.—Inflexible 450, Dugueschin 450, Donnawerth 600, Fontenoy 600, Charlemagne 450, Duquesne 450, Tourville 450, Alexandre 600, Jean-Bart 450.

STEAM VESSELS.

SHIPS OF 90 GUNS, 960 HORSE POWER.—Napoleon, Imperiel, Algesiras.

FRIGATES OF 650 HORSE POWER.—Mogador, Isly.

FRIGATES OF 540 HORSE POWER.—Descartes, Vauban.

FRIGATES OF 450 HORSE POWER.—Gomer, Asmodee, Labrador, Magellan, Montezuma, Cacique, Panama, Eldorado, Pomone, Albatros, Sane, Orenoque, Ch. Columb, Canada, Ulloa, Darien, Caffarelli.

MIXED FRIGATES—(New Construction.)

800 HORSE POWER, 50 GUNS.—Imperatrice Eugenie, Indomitable, Foudre, Audacieuse.

CORVETTES OF 400 HORSE POWER.—

Infernal, Reine Hortense, Bertholet, Catinat, Rolland, Phlegeton, Laplace, Primaugnet, Dassas.

CORVETTES OF 320 HORSE POWER.—Prony, Caton, Colbert.

CORVETTES OF 300 HORSE POWER.—Patriote, Eumenide, Gorgone, Tanger, Coligny, Tisiphone.

CORVETTES OF 220 HORSE POWER.—Espadon, Veloce, Lavoisier, Cameleon, Gassendi, Pluton, Archimede, Duchayla, Phoque, Elan, Caiman, Titan, Cassini, Chaptal, Newton.

ADVICE VESSELS.

OF 200 HORSE POWER.—Monette, Heron, Laborieux, Eclaireur, Phenix, Lucifer, Biche, Goeland, Promethee, Souffleur, Milan, Aigle, Megere, Sentinelle.

OF 180 HORSE POWER.—Petrel, Reguin, Epervier, Dauphin.

OF 160 HORSE POWER.—Ardent, Crocodile, Phare, Fulton, Meteore, Chimere, Vantour, Styx, Acheron, Cerbere, Tartare, Phæton, Cocyte, Tonnerre, Gregois, Grondeur, Euphrate, Tenare, Australie, Narval, Bruddon, Solon, Etna, Sesostris.

OF 120 HORSE POWER.—Castor, Brazier, Flambeau, Vedette, Passe-Partout, Pelican, Ramier, Salamandre, Ariel, Daim, Flambart,

Marceau.

OF 100 HORSE POWER.—Anacreon, Averne, Tantale, Galilee.

OF 80 HORSE POWER.—Galibi, Voyageur, Marabout, Alecton, Rubis, Eperlan.

OF 60 HORSE POWER.—Antilope, Chacul, Liamone, Var.

OF 40 HORSE POWER.—Grand-Bassam, Ebrie.

OF 30 HORSE POWER.—Basilic, Serpent, Pinogouin, Guet n'Dar.

OF 20 HORSE POWER.—Oyapock, Acbar.

FLOATING BATTERIES.

Devastation, Lave, Tonnate, Foudroyante.

GUN BOATS.

Stridente, Mitraille, Etincelle, Bombe, Eclair, Flamme, Alarme, Coulevaine, Doilleuse, Alerte, Meurtriere, Bourasque, Raffale, Fusee, Foudre, Fleche, Grenade, Mutine, Tourmente.

MIXED TRANSPORTS.

Ariege, Adour, Durance, Loiret, Gironde, Marne, Aube, Rhin, Charente, Nievre, Rhone, Tarn, Mosselle, Yonne, Saone, Loire, Isere, Dordogne, Allier, Meurthe, Finestere, Meuse,

Oise, Somme, Garone.

GENERAL RECAPITULATION.

SAILING VESSELS.

		Guns.
31	ships of all sizes, mounting an aggregate of	2,866
61	frigates, mounting an aggregate of	3,028
49	corvettes, mounting an aggregate of	1,024
57	brigs, mounting an aggregate of	1,006
14	corvettes de charge, mounting an aggregate of	448
28	sloops, mounting an aggregate of	444
38	schooners, mounting an aggregate of	228
33	cutters, mounting an aggregate of	132
317	sailing vessels, carrying a grand aggregate of	9,176

STEAM VESSELS.

		Guns.
27	ships of all sizes, mounting an aggregate of	2,680
21	frigates, mounting an aggregate of	336

4	frigates, (new construction,), mounting an aggregate of	200
34	corvettes of all sizes, mounting an aggregate of	939
76	advice boats, mounting an aggregate of	456
4	floating batteries, mounting an aggregate of	64
19	gun boats, mounting an aggregate of	76
25	mixed transports, mounting an aggregate of	150
220	sailing vessels, mounting an aggregate of	4,901

ORDINARY CLASSIFICATION OF NAVAL OFFICERS.

2 admirals in time of peace, and 3 in time of war; 13 vice admirals; 22 rear admirals; 113 captains of ships of the 1st and 2d classes; 235 captains of frigates; 679 lieutenants of ships of the 1st and 2d classes; 550 ensigns of ships; 109 midshipmen of 1st class; 165 midshipmen of the 2d class.

With respect to the classes of midshipmen, the admiral minister of marine regulates yearly the number of young gentlemen who may be received in the service.

According to the navy list for 1856, (July,) the effective force of the navy of Great Britain was at that period:

			Guns.
Sailing vessels,	269,	carrying an aggregate of	9,362
Steam vessels,	258,	carrying an aggregate of	4,518
Total,	527,	carrying an aggregate of	13,880

The classification of officers was:

	In service.	On half pay.	Retired.	Total.
Admirals,	21	15	—	36
Vice-admirals,	27	19	—	46
Rear-admirals,	51	55	129	235
Captains of ships,	396	60	318	774
Commanders,	551	64	286	901
Lieutenants,	1,139	668	—	1,807

NAVY OF THE UNITED STATES.

Name.	Rate.	Where built.	When built
SHIPS OF THE LINE, (10.)			
Pennsylvania,	120	Philadelphia,	1837
Columbus,	80	Washington,	1819
Ohio,	84	New-York,	1820
North-Carolina,	84	Philadelphia,	1820
Delaware,	84	Norfolk,	1820

Alabama,	84		
Virginia,	84		
Vermont,	84	Boston,	1848
New-York,	84		
New-Orleans,	84		
FRIGATES, (18.)			
Independence,	56	Boston,	1814
United States,	50	Philadelphia,	1797
Constitution,	50	Boston,	1797
Potomac,	50	Washington,	1821
Brandywine,	50	Washington,	1825
Columbia,	50	Washington,	1836
Congress,	50	Portsmouth, N. H.	1841
Cumberland,	50	Boston,	1842
Savannah,	50	New-York,	1842
Raritan,	50	Philadelphia,	1843
Santee,	50		
Sabine,	50		
St. Lawrence,	50	Norfolk,	1847
SLOOPS OF WAR, (19.)			
Constellation,	22	Rebuilt, Norfolk,	1854
Macedonian,	22	Rebuilt, Norfolk,	1836
Portsmouth,	22	Portsmouth, N.H.	1843
Plymouth,	22	Boston,	1843
St. Mary's,	22	Washington,	1844
Jamestown,	22	Norfolk,	1844
Germantown,	22	Philadelphia,	1846
Saratoga,	20	Portsmouth, N.H.	1842
John Adams,	20	Rebuilt, Norfolk,	1831
Vincennes,	20	New-York,	1826

Falmouth,	20	Boston,	1827
Vandalia,	20	Philadelphia,	1828
St. Louis,	20	Washington,	1828
Cyane,	20	Boston,	1837
Levant,	20	New-York,	1837
Decatur,	16	New-York,	1839
Marion,	16	Boston,	1839
Dale,	16	Philadelphia,	1839
Preble,	16	Portsmouth, N. H.	1839
BRIGS, (3.)			
Bainbridge,	6	Boston,	1842
Perry,	6	Norfolk,	1843
Dolphin,	4	New-York,	1836
SCHOONER.			
Fenimore Cooper,	3	Purchased,	1852
STEAMERS.			
Screw Steamers, 1st class.			
Franklin,	50		
Merrimack,	40	Boston,	1855
Wabash,	40	Philadelphia,	1855
Minnesota,	40	Washington,	1855
Roanoke,	40	Norfolk,	1855
Colorado,			
Niagara,			
Screw Steamer, 2d class.			
San Jacinto,	13	New-York,	1850
Screw Steamers, 3d class.			
Massachusetts,	9	Transferred from War Dep't.	
Princeton,	10	Rebuilt, Norfolk,	1851
Side-wheel Steamers, 1st class.			

Mississippi,	10	Philadelphia,	1841
Susquehanna,	15	Philadelphia,	1850
Powhatan,	9	Norfolk,	1850
Side-wheel Steamer, 2d class.			
Saranac,	6	Portsmouth, N. H.	1848
Side-wheel Steamers, 3d class.			
Michigan,	1	Erie, Pa.,	1844
Fulton,	5	New-York,	1837
Alleghany,	10	Pittsburgh, Pa.,	1847
Water Witch,	2	Washington,	1845
John Hancock,	2	Boston,	1850
STEAM TENDERS.			
Despatch,		Purchased,	1855
Engineer		Purchased,	
Arctic,		Purchased,	1855
STORE-SHIPS.			
Relief,	6	Philadelphia,	1836
Supply,	4	Purchased,	1846
Warren,		Boston,	1826
Fredonia,	4	Purchased,	1846
Release,	2	Purchased,	1855

The United States Navy has 64 Captains, 96 Commanders, 311 Lieutenants, 69 Surgeons, 43 Passed Assistant Surgeons, 37 Assistant Surgeons, 64 Pursers, 24 Chaplains, 12 Mathematicians, 24 Masters, 24 Passed Midshipmen, 30 Midshipmen, and 145 Probationary Midshipmen and Students.—*Taken from the Navy Register of 1857.*

Transcriber's Note.

To aid clarity, ditto marks have been replaced with full text throughout.

*** END OF THE PROJECT GUTENBERG EBOOK OCEAN STEAM NAVIGATION AND THE OCEAN POST ***

Updated editions will replace the previous one—the old editions will be renamed.

Creating the works from print editions not protected by U.S. copyright law means that no one owns a United States copyright in these works, so the Foundation (and you!) can copy and distribute it in the United States without permission and without paying copyright royalties. Special rules, set forth in the General Terms of Use part of this license, apply to copying and distributing Project Gutenberg™ electronic works to protect the PROJECT GUTENBERG™ concept and trademark. Project Gutenberg is a registered trademark, and may not be used if you charge for an eBook, except by following the terms of the trademark license, including paying royalties for use of the Project Gutenberg trademark. If you do not charge anything for copies of this eBook, complying with the trademark license is very easy. You may use this eBook for nearly any purpose such as creation of derivative works, reports, performances and research. Project Gutenberg eBooks may be modified and printed and given away—you may do practically ANYTHING in the United States with eBooks not protected by U.S. copyright law. Redistribution is subject to the trademark license, especially commercial

redistribution.

START: FULL LICENSE

THE FULL PROJECT GUTENBERG™ LICENSE

PLEASE READ THIS BEFORE YOU DISTRIBUTE OR USE THIS WORK

To protect the Project Gutenberg™ mission of promoting the free distribution of electronic works, by using or distributing this work (or any other work associated in any way with the phrase “Project Gutenberg”), you agree to comply with all the terms of the Full Project Gutenberg License available with this file or online at www.gutenberg.org/license.

Section 1. General Terms of Use and Redistributing Project Gutenberg electronic works

1.A. By reading or using any part of this Project Gutenberg electronic work, you indicate that you have read, understand, agree to and accept all the terms of this license and intellectual property (trademark/copyright) agreement. If you do not agree to abide by all the terms of this agreement, you must cease using and return or destroy all copies of Project Gutenberg electronic works in your possession. If you paid a fee for obtaining a copy of or access to a Project Gutenberg electronic work and you do not agree to be bound by the terms of this agreement, you may obtain a refund from the person or entity to whom you paid the fee as set

forth in paragraph 1.E.8.

1.B. “Project Gutenberg” is a registered trademark. It may only be used on or associated in any way with an electronic work by people who agree to be bound by the terms of this agreement. There are a few things that you can do with most Project Gutenberg electronic works even without complying with the full terms of this agreement. See paragraph 1.C below. There are a lot of things you can do with Project Gutenberg electronic works if you follow the terms of this agreement and help preserve free future access to Project Gutenberg electronic works. See paragraph 1.E below.

1.C. The Project Gutenberg Literary Archive Foundation (“the Foundation” or PGLAF), owns a compilation copyright in the collection of Project Gutenberg electronic works. Nearly all the individual works in the collection are in the public domain in the United States. If an individual work is unprotected by copyright law in the United States and you are located in the United States, we do not claim a right to prevent you from copying, distributing, performing, displaying or creating derivative works based on the work as long as all references to Project Gutenberg are removed. Of course, we hope that you will support the Project Gutenberg mission of promoting free access to electronic works by freely sharing Project Gutenberg works in compliance with the terms of this agreement for keeping the Project Gutenberg name associated with the work. You can easily comply with the terms of this agreement by keeping this work in the same format with its attached full Project

Gutenberg License when you share it without charge with others.

1.D. The copyright laws of the place where you are located also govern what you can do with this work. Copyright laws in most countries are in a constant state of change. If you are outside the United States, check the laws of your country in addition to the terms of this agreement before downloading, copying, displaying, performing, distributing or creating derivative works based on this work or any other Project Gutenberg work. The Foundation makes no representations concerning the copyright status of any work in any country other than the United States.

1.E. Unless you have removed all references to Project Gutenberg:

1.E.1. The following sentence, with active links to, or other immediate access to, the full Project Gutenberg License must appear prominently whenever any copy of a Project Gutenberg work (any work on which the phrase “Project Gutenberg” appears, or with which the phrase “Project Gutenberg” is associated) is accessed, displayed, performed, viewed, copied or distributed:

> This eBook is for the use of anyone anywhere in the United States and most other parts of the world at no cost and with almost no restrictions whatsoever. You may copy it, give it away or re-use it under

the terms of the Project Gutenberg™ License included with this eBook or online at www.gutenberg.org. If you are not located in the United States, you will have to check the laws of the country where you are located before using this eBook.

1.E.2. If an individual Project Gutenberg electronic work is derived from texts not protected by U.S. copyright law (does not contain a notice indicating that it is posted with permission of the copyright holder), the work can be copied and distributed to anyone in the United States without paying any fees or charges. If you are redistributing or providing access to a work with the phrase “Project Gutenberg” associated with or appearing on the work, you must comply either with the requirements of paragraphs 1.E.1 through 1.E.7 or obtain permission for the use of the work and the Project Gutenberg trademark as set forth in paragraphs 1.E.8 or 1.E.9.

1.E.3. If an individual Project Gutenberg electronic work is posted with the permission of the copyright holder, your use and distribution must comply with both paragraphs 1.E.1 through 1.E.7 and any additional terms imposed by the copyright holder. Additional terms will be linked to the Project Gutenberg License for all works posted with the permission of the copyright holder found at the beginning of this work.

1.E.4. Do not unlink or detach or remove the full

Project Gutenberg License terms from this work, or any files containing a part of this work or any other work associated with Project Gutenberg.

1.E.5. Do not copy, display, perform, distribute or redistribute this electronic work, or any part of this electronic work, without prominently displaying the sentence set forth in paragraph 1.E.1 with active links or immediate access to the full terms of the Project Gutenberg License.

1.E.6. You may convert to and distribute this work in any binary, compressed, marked up, nonproprietary or proprietary form, including any word processing or hypertext form. However, if you provide access to or distribute copies of a Project Gutenberg work in a format other than “Plain Vanilla ASCII” or other format used in the official version posted on the official Project Gutenberg website (www.gutenberg.org), you must, at no additional cost, fee or expense to the user, provide a copy, a means of exporting a copy, or a means of obtaining a copy upon request, of the work in its original “Plain Vanilla ASCII” or other form. Any alternate format must include the full Project Gutenberg License as specified in paragraph 1.E.1.

1.E.7. Do not charge a fee for access to, viewing, displaying, performing, copying or distributing any Project Gutenberg works unless you comply with paragraph 1.E.8 or 1.E.9.

1.E.8. You may charge a reasonable fee for copies of or providing access to or distributing Project Gutenberg electronic works provided

that:

- You pay a royalty fee of 20% of the gross profits you derive from the use of Project Gutenberg works calculated using the method you already use to calculate your applicable taxes. The fee is owed to the owner of the Project Gutenberg trademark, but he has agreed to donate royalties under this paragraph to the Project Gutenberg Literary Archive Foundation. Royalty payments must be paid within 60 days following each date on which you prepare (or are legally required to prepare) your periodic tax returns. Royalty payments should be clearly marked as such and sent to the Project Gutenberg Literary Archive Foundation at the address specified in Section 4, “Information about donations to the Project Gutenberg Literary Archive Foundation.”

- You provide a full refund of any money paid by a user who notifies you in writing (or by e-mail) within 30 days of receipt that s/he does not agree to the terms of the full Project Gutenberg™ License. You must require such a user to return or destroy all copies of the works possessed in a physical medium and discontinue all use of and all access to other copies of Project Gutenberg™ works.

- You provide, in accordance with paragraph 1.F.3, a full refund of any money paid for a work or a replacement copy, if a defect in the electronic work is discovered and reported to you within 90 days of receipt of the work.

• You comply with all other terms of this agreement for free distribution of Project Gutenberg™ works.

1.E.9. If you wish to charge a fee or distribute a Project Gutenberg™ electronic work or group of works on different terms than are set forth in this agreement, you must obtain permission in writing from the Project Gutenberg Literary Archive Foundation, the manager of the Project Gutenberg™ trademark. Contact the Foundation as set forth in Section 3 below.

1.F.

1.F.1. Project Gutenberg volunteers and employees expend considerable effort to identify, do copyright research on, transcribe and proofread works not protected by U.S. copyright law in creating the Project Gutenberg™ collection. Despite these efforts, Project Gutenberg™ electronic works, and the medium on which they may be stored, may contain “Defects,” such as, but not limited to, incomplete, inaccurate or corrupt data, transcription errors, a copyright or other intellectual property infringement, a defective or damaged disk or other medium, a computer virus, or computer codes that damage or cannot be read by your equipment.

1.F.2. LIMITED WARRANTY, DISCLAIMER OF DAMAGES - Except for the “Right of Replacement or Refund” described in paragraph 1.F.3, the Project Gutenberg Literary Archive Foundation, the owner of the Project Gutenberg™ trademark, and any other party

distributing a Project Gutenberg™ electronic work under this agreement, disclaim all liability to you for damages, costs and expenses, including legal fees. YOU AGREE THAT YOU HAVE NO REMEDIES FOR NEGLIGENCE, STRICT LIABILITY, BREACH OF WARRANTY OR BREACH OF CONTRACT EXCEPT THOSE PROVIDED IN PARAGRAPH 1.F.3. YOU AGREE THAT THE FOUNDATION, THE TRADEMARK OWNER, AND ANY DISTRIBUTOR UNDER THIS AGREEMENT WILL NOT BE LIABLE TO YOU FOR ACTUAL, DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE OR INCIDENTAL DAMAGES EVEN IF YOU GIVE NOTICE OF THE POSSIBILITY OF SUCH DAMAGE.

1.F.3. LIMITED RIGHT OF REPLACEMENT OR REFUND - If you discover a defect in this electronic work within 90 days of receiving it, you can receive a refund of the money (if any) you paid for it by sending a written explanation to the person you received the work from. If you received the work on a physical medium, you must return the medium with your written explanation. The person or entity that provided you with the defective work may elect to provide a replacement copy in lieu of a refund. If you received the work electronically, the person or entity providing it to you may choose to give you a second opportunity to receive the work electronically in lieu of a refund. If the second copy is also defective, you may demand a refund in writing without further opportunities to fix the problem.

1.F.4. Except for the limited right of replacement or refund set forth in paragraph 1.F.3, this work

is provided to you ‘AS-IS’, WITH NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE.

1.F.5. Some states do not allow disclaimers of certain implied warranties or the exclusion or limitation of certain types of damages. If any disclaimer or limitation set forth in this agreement violates the law of the state applicable to this agreement, the agreement shall be interpreted to make the maximum disclaimer or limitation permitted by the applicable state law. The invalidity or unenforceability of any provision of this agreement shall not void the remaining provisions.

1.F.6. INDEMNITY - You agree to indemnify and hold the Foundation, the trademark owner, any agent or employee of the Foundation, anyone providing copies of Project Gutenberg™ electronic works in accordance with this agreement, and any volunteers associated with the production, promotion and distribution of Project Gutenberg™ electronic works, harmless from all liability, costs and expenses, including legal fees, that arise directly or indirectly from any of the following which you do or cause to occur: (a) distribution of this or any Project Gutenberg work, (b) alteration, modification, or additions or deletions to any Project Gutenberg work, and (c) any Defect you cause.

Section 2. Information about the Mission

of Project Gutenberg

Project Gutenberg is synonymous with the free distribution of electronic works in formats readable by the widest variety of computers including obsolete, old, middle-aged and new computers. It exists because of the efforts of hundreds of volunteers and donations from people in all walks of life.

Volunteers and financial support to provide volunteers with the assistance they need are critical to reaching Project Gutenberg's goals and ensuring that the Project Gutenberg collection will remain freely available for generations to come. In 2001, the Project Gutenberg Literary Archive Foundation was created to provide a secure and permanent future for Project Gutenberg and future generations. To learn more about the Project Gutenberg Literary Archive Foundation and how your efforts and donations can help, see Sections 3 and 4 and the Foundation information page at www.gutenberg.org.

Section 3. Information about the Project Gutenberg Literary Archive Foundation

The Project Gutenberg Literary Archive Foundation is a non-profit 501(c)(3) educational corporation organized under the laws of the state of Mississippi and granted tax exempt status by the Internal Revenue Service. The Foundation's EIN or federal tax identification number is 64-6221541. Contributions to the Project Gutenberg Literary Archive Foundation

are tax deductible to the full extent permitted by U.S. federal laws and your state's laws.

The Foundation's business office is located at 41 Watchung Plaza #516, Montclair NJ 07042, USA, +1 (862) 621-9288. Email contact links and up to date contact information can be found at the Foundation's website and official page at www.gutenberg.org/contact

Section 4. Information about Donations to the Project Gutenberg Literary Archive Foundation

Project Gutenberg™ depends upon and cannot survive without widespread public support and donations to carry out its mission of increasing the number of public domain and licensed works that can be freely distributed in machine-readable form accessible by the widest array of equipment including outdated equipment. Many small donations ($1 to $5,000) are particularly important to maintaining tax exempt status with the IRS.

The Foundation is committed to complying with the laws regulating charities and charitable donations in all 50 states of the United States. Compliance requirements are not uniform and it takes a considerable effort, much paperwork and many fees to meet and keep up with these requirements. We do not solicit donations in locations where we have not received written confirmation of compliance. To SEND DONATIONS or determine the status of compliance for any particular state visit

www.gutenberg.org/donate.

While we cannot and do not solicit contributions from states where we have not met the solicitation requirements, we know of no prohibition against accepting unsolicited donations from donors in such states who approach us with offers to donate.

International donations are gratefully accepted, but we cannot make any statements concerning tax treatment of donations received from outside the United States. U.S. laws alone swamp our small staff.

Please check the Project Gutenberg web pages for current donation methods and addresses. Donations are accepted in a number of other ways including checks, online payments and credit card donations. To donate, please visit: www.gutenberg.org/donate.

Section 5. General Information About Project Gutenberg electronic works

Professor Michael S. Hart was the originator of the Project Gutenberg concept of a library of electronic works that could be freely shared with anyone. For forty years, he produced and distributed Project Gutenberg eBooks with only a loose network of volunteer support.

Project Gutenberg eBooks are often created from several printed editions, all of which are confirmed as not protected by copyright in the U.S. unless a copyright notice is included. Thus, we do not necessarily keep eBooks in

compliance with any particular paper edition.

Most people start at our website which has the main PG search facility: www.gutenberg.org.

This website includes information about Project Gutenberg, including how to make donations to the Project Gutenberg Literary Archive Foundation, how to help produce our new eBooks, and how to subscribe to our email newsletter to hear about new eBooks.