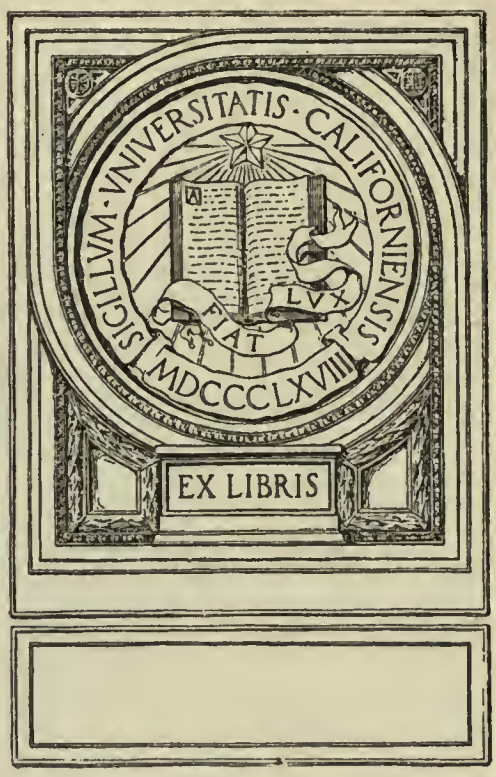
The Panama Canal
and the
Pacific Coast

William B. Dana Company
Publishers
Commercial and Financial Chronicle
Chronicle Building, New York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PEACE

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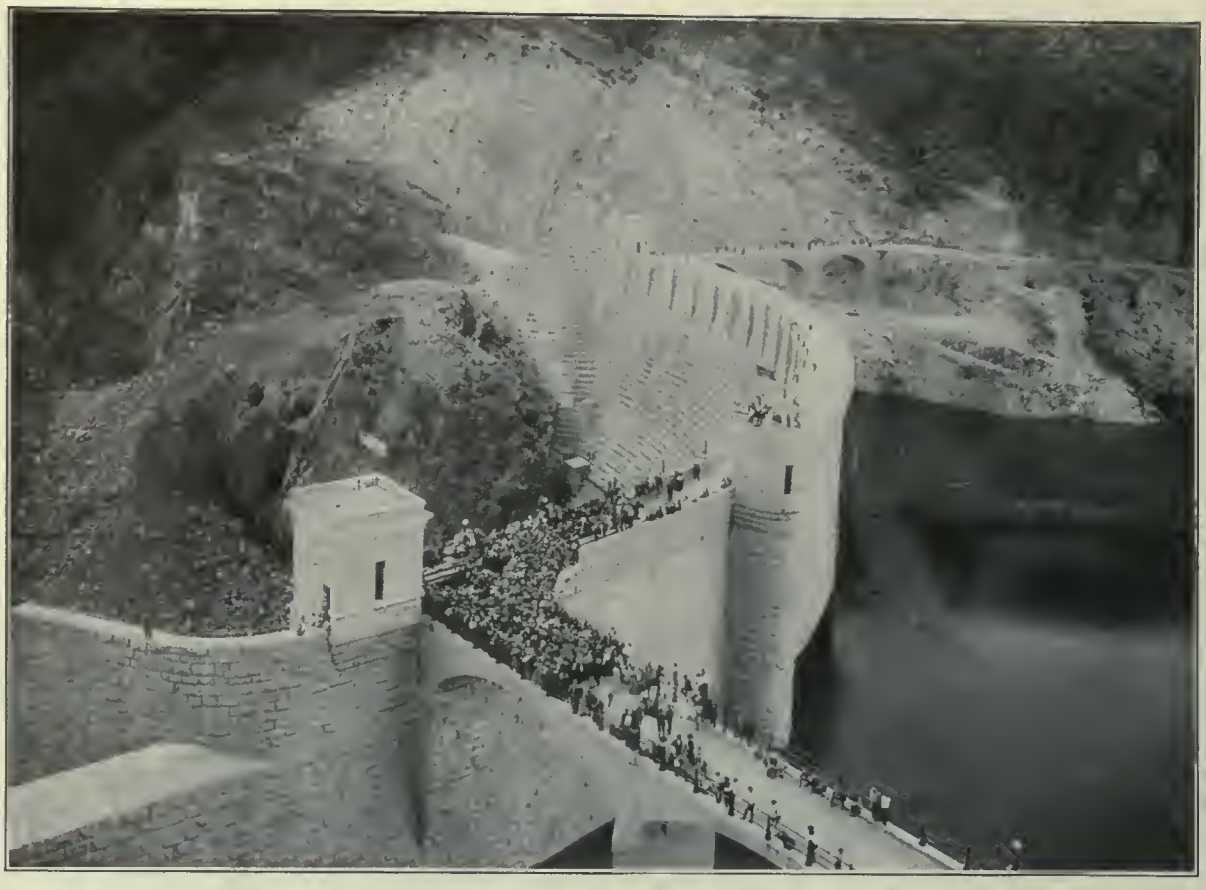

THE ROOSEVELT DAM, SALT RIVER VALLEY, ARIZONA. A GOVERNMENT RECLAMATION PROJECT IRRIGATING, AT PRESENT, 152,000 ACRES.

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IN THE FINANCIAL DISTRICT OF SAN FRANCISCO.

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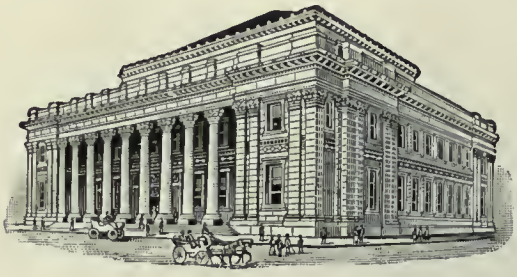
Illinois Trust and Savings Bank



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Condensed Facts

regarding the largest Farm Machinery Manufacturer west of the Missouri River

Established 1869; incorporated 1892.

Two factories, 1,000 employes.

Stockton factory occupies seven city blocks.

Self-propelled harvesters—two models—14 to 34-foot cut.

Caterpillar tractors made in the following sizes—18, 30, 60 and 75 horsepower.

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Holt machines harvest three-fourths of all grain grown on Pacific Coast—90 per cent of California's crop. Over 6,000 in use.

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New York, N. Y.
Peoria, Ill.
Spokane, Wash.
Portland, Ore.
Calgary, Alberta

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ORANGES AND SNOW IN CALIFORNIA.

Delivery outfits at one of the San Francisco Plants of National Ice and Cold Storage Company of California.

Icing cars at one of the San Joaquin Valley Plants of National Ice and Cold Storage Company of California.

Express cars waiting to be iced at one of the plants of National Ice and Cold Storage Company of California.

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NATIONAL ICE AND COLD STORAGE CO.

Postal Telegraph Building — OF CALIFORNIA — SAN FRANCISCO

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FIRST NATIONAL BANK OF LOS ANGELES

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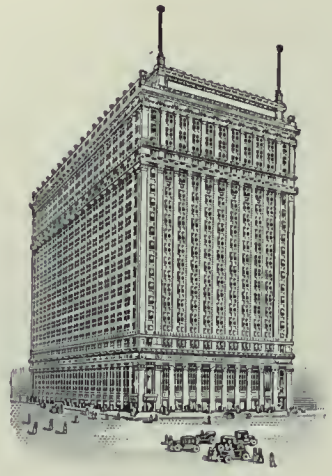
The Continental and Commercial National Bank transacts a commercial banking business and has every modern banking facility with each department under official supervision. Patrons are offered courteous, efficient and prompt service.



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Continental and Commercial Trust and Savings Bank

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The Capital Stock of the Continental and Commercial Trust and Savings Bank and the Hibernian Banking Association are owned by the Stockholders of the Continental and Commercial National Bank of Chicago.

Combined Deposits of these Banks, $250,000,000

Attention is called to the announcement on page 11

The Panama Canal
and the
Pacific Coast

Originally issued as a supplement of

The Commercial and Financial Chronicle
New York, November 28, 1914

and, by special arrangement with the publishers, simultaneously issued, in the same manner, by THE ECONOMIST, of London, Eng., and THE ECONOMIST, of Chicago.

Compiled and Edited by Geo. M. Shepherd

Foreword

THE purpose of the publishers in offering this edition is to provide an authentic and reliable work of reference on the commercial and financial conditions as existing in the Pacific Coast territory of the United States at the time of the opening of the Panama Canal.

The publishers have endeavored to make the advertising pages of this edition as valuable to the reader for purposes of reference as the editorial and special articles, and statistical tables.

With this end in view they have exercised careful scrutiny and discrimination as to the character of the advertising appearing herein, without regard to a possible sacrifice in its volume.

Representatives of the publishers have necessarily spent much time in the Pacific Coast territory in connection with the work entailed by the preparation and publication of this issue. They have given painstaking attention to inquiries from the most reliable sources of information available as to the responsibility of prospective advertisers. Advertising for this edition has been solicited only from those whose standing and reputation careful investigation has revealed to be of the best.

The publishers, therefore, feel justified in stating that, to the best of their information and belief, the advertising pages of this issue may be relied upon by the reader both as to the statements made therein and the responsibility of the advertisers.

William B. Dana Company

Publishers

Commercial and Financial Chronicle

Chronicle Building, New York

THE GOLDEN GATE.

Attention is called to the announcement on page 11

A STAND OF FINE SUGAR AND WHITE PINE IN THE SHASTA DISTRICT, CALIFORNIA.

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RETAIL DISTRICT OF SEATTLE AND THE OLYMPIC MOUNTAINS.

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Copyright by Gifford, Portland.

PORTLAND FROM CITY PARK.

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THE YOSEMITE VALLEY. HALF DOME IN THE FOREGROUND.

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CHICAGO
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Purchase, Finance, Design, Construct and Operate Electric Light, Gas, Street Railway and Water Power Properties

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Tacoma Gas Company
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Everett, Washington

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Corn Exchange Bank Building

NORTHWEST CORNER ADAMS AND LA SALLE STREETS

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FOREIGN EXCHANGE LETTERS OF CREDIT CABLE TRANSFERS

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EDITORIAL SECTION

THE PACIFIC COAST.

At a time when the columns of the press are so largely devoted to chronicling the events of a great war, and attempting to prognosticate its results; and when the financial journals are chiefly concerned in discussing, and striving to solve, the many and varied problems arising from conditions created by a world disturbance of such magnitude, there is no little satisfaction in presenting to our readers an issue devoted to so great an achievement of Peace as the Panama Canal, and to a territory so pregnant with possibility in peaceful pursuits as the Pacific Coast of the United States.

Departing from their usual custom, the publishers herein offer an edition which is, except for the statistical departments, composed entirely of contributed articles. In arranging for each of these articles dealing with conditions on the Pacific Coast the publishers have sought, and have been so fortunate as to secure, the co-operation of the individual to whom a concensus of opinion pointed as best equipped and qualified to deal with the special subject assigned to him. The opinions of these contributors are based on experience, not on theory.

As we have become familiar with these various articles, during the process of assembling, co-ordinating, and preparing the edition for the press, we have been particularly impressed by certain points of unanimous agreement in the opinions expressed. As the articles cover a broad range of activity, and emanate from minds working along widely diversified channels, such concordances are significant, and it seems pertinent to direct the reader's attention to them. It may also be well to emphasize the fact that where our contributors unite in a common opinion they are in entire accord with those leaders of commercial thought and activity who are directing the work of intelligent development and substantial progress throughout the entire West Coast territory.

The first of these points in importance is, generally speaking, the last to be brought out in the individual articles, namely: the secure confidence with which the future is awaited—the dominant note of optimism. It is not uncommon to hear, from those but vaguely familiar with conditions on the Pacific Coast, expressions of opinion to the effect that affairs there are in a sad way; that a revival of activity is remote, if not improbable. Such is not, in fact, the case. The Pacific Coast may pause to permit of a re-adjustment of fundamental conditions. In its periods of more strenuous activity, basic economic principles trail, breathless, in the wake of the impetuous optimism and headlong energy which characterize its progress. Re-adjustments are thus rendered necessary. Also, since no human energy is absolutely indefatigable, prodigal expenditures of vital force necessitate occasional recruiting intervals of relaxation. Thus, the Coast may pause—must, indeed—but let none be so fatuous as to believe that it will stop.

The Pacific Coast, in common with the rest of us, has made its mistakes and is suffering for them; the more keenly in that, during a normal period of rehabilitation and adjustment, events conspire to bring about a time of stress, when the results of all mistakes are magnified, and made peculiarly obvious and painful. That such mistakes are fully appreciated, and that constructive minds are engaged in devising remedies, is the second point which will become apparent in the perusal of the subsequent pages.

The third is: the unanimous recognition of the fact that the future influx of population to the Pacific Coast must be diverted, to as great a degree as possible, onto the land. Commerce may be broadly classified in three elementary divisions: Production, Conversion, and Merchandising, the first including only the development of natural resources and the actual creation of wealth, the second comprehending the treatment of raw materials by manufacture, the third involving the transfer of commodities between men or nations. Activity in the first of these divisions distributes population over the agricultural lands, through the forest areas, and in the mountainous regions. The second and third divisions create cities, either as industrial centers or as logical points of transfer. Both of the latter divisions being wholly dependent upon the first, it is obvious that population should adjust itself accordingly. It is an economic error to rear large cities on the edge of a great potentially productive territory, only a small percentage of which is fully developed. The Pacific Coast logically falls into the first of the three divisions. From the standpoint of its ultimate possibilities, productive development of the Pacific Coast has only been fairly begun, while its cities have grown with an astounding and disportionate rapidity. Census figures show a much larger percentage of urban population on the Pacific Coast today than in other essentially productive areas in the United States. The Coast may be termed, to coin a phrase, "over-citied," for the time being. The contemplated effort at diversion of population onto the land will gradually correct the error, and the result will be a sounder economic basis throughout the territory.

The fourth point of unanimity to be noted is: that land values on the Pacific Coast have advanced too far, and too fast. It is frequently remarked by those most actively engaged in the Coast's permanent and sane development that the incubus from which the territory has suffered most in the past has been the unscrupulous real estate promoter, colloquially (but aptly) termed "land shark." The operations of those that prey on the credulous were there made so easy and profitable by the alluring possibilities of high returns from irrigated land, that their business extended with such rapidity as to become a serious menace to the prosperity of the territory.

Illustrative of what is being done on the Coast to remedy the situation as regards land values, and to discourage the further activities of the "land shark," witness the sweeping reductions in the price of raw land, and the restrictions re-

garding its sale, which have been instituted by the railroads, and other large landholders, as cited in a subsequent article. A recent decision of Judge Bean in a United States district court in Oregon is likewise apposite for purposes of illustration. The case in point was a suit brought by land purchasers against the sellers, alleging misrepresentation of the productive possibilities of the land. In deciding for the plaintiffs the presiding judge ordered the return of all payments on the contract, together with the costs of the action, stating that the sellers "must know what the land is good for"; belief in its possibilities not constituting a sufficient defense against the charge of misrepresentation. The adoption of such drastic measures will do much to correct the mistakes of the past, and eliminate the possibility of their repetition.

Much of the publicity that has emanated from the Pacific Coast has been unfortunate in character. Consisting largely of the propaganda of the self-interested, it has been highly bombastic; teeming with hyperbole. It has exaggerated all the attractions (inventing them when occasion demanded), and carefully avoided any mention whatsoever of any existing difficulties to be encountered. Its tendency has been to attract the invalid, seeking a salubrious climate where an exceptional fruitfulness of soil might offset impaired physical efficiency; the indolent, thinking to obtain a maximum return for a minimum of effort; the incompetent, hoping that, where a benign nature dispenses special largess, lack of ordinary ability would not be so apparent, nor its results so painful. Such types are a benefit to no community, least of all, perhaps, to the Pacific Coast, where the tremendous amount of development yet to be accomplished demands a little more than an average man's-sized day's work from each inhabitant every twenty-four hours. The failures of such deluded ones have added no small quota to the disastrous results of the operations of the "land shark."

Commercial organizations, variously designated, abound on the Pacific Coast. Many of these owe their origin to the local activities of the traffic department of one of the transcontinental railroad systems, which has indirectly profited by fostering and encouraging them. While these organizations have been laudably energetic and enthusiastic, they are frequently ineffectual, either because badly managed, or because insufficiently informed as to the real needs of the community which they were attempting to serve, or both. Of late, a number of such organizations have undertaken to make a serious study of conditions and conduct development and publicity campaigns with intelligence and efficiency. These are performing a real service to their respective territories. They eliminate misrepresentation, in so far as is possible, and endeavor, by presenting the real facts to prospective settlers, to prevent an influx of indigents and undesirables. The Coast wishes to increase, not only its population, but also its thought units, and units of energy per square mile.

The real work of development and progress was begun, and is being continued, by men of the largest physical and mental capacity. The hostile Redman, the weary miles of unknown desert, the difficult mountain ranges, and other obstacles encountered and overcome by the pioneers, precluded the possibility of any but the sturdiest and most courageous reaching the Coast at all in the days of early settlement. Such men have developed the Coast, and, conversely, the Coast develops such men. Undoubtedly climatic conditions are partially responsible, but there is something deeper, more subtle, and more inspiring, at work at man-making on the Pacific Coast. The very vastness of the territory, its great distances, and the sense of limitless expanse which it engenders, seems to demand mental expansion and expansiveness. Magnitude is omni-present on the Pacific Coast. Its mountains are capped with eternal snows, while in its fertile valleys, millions of acres bask in eternal summer. The Coast mentions a chasm as worthy of note; it is thirteen miles wide and a mile deep; a waterfall; it has a sheer fall of half a mile. Trees grow four hundred feet high, and, through apertures made in their base the Coast drives its coach and four. Comparisons superimposing a considerable group of the European countries, with a number of our eastern states thrown in for good measure, on one of the Pacific Coast states, and still leaving a respectable margin, have been worn threadbare to odium. None the less the physical bigness of things is inspirational, and has its own peculiar effect on those to whom such wonders are the commonplaces of their immediate surroundings. Take at random some of the figures which will be found on the ensuing pages: six hundred continuous miles of high tension, steel towered, transmission line; five hundred and fifty thousand horse power; four billion, three hundred million barrels of oil; fifteen hundred and twelve billion, nine hundred million feet of standing timber. The business man of the Pacific Coast must not only deal constantly in such figures in the regular course of routine work; but, to transact his business intelligently, he must be able to comprehend them and their significance. Small wonder that he expands in imagination, looks far into the future, and falls into an expansive habit of mind. Nor can he be severely censured if he grows to be rather cavalier in his treatment of 1.3 inches, or tupence ha'penny.

Rome has sat for centuries on her seven hills, and seen the westward march of empire reach and pass her; Seattle, finding herself somewhat similarly located topographically, decided that hills were bad for business. Visioning an empire to come, she temporarily removed herself from her hills and proceeded to dispense with them by means of the most abundant available commodity —water. The hills were sluiced away onto the tide-flats, where they make excellent factory sites. In replacing herself on the leveled land, Seattle demands quarters so modern that they include a forty-two story office building.

On the hot ashes of one of the most dire municipal disasters in history, San Francisco began her rehabilitation, and in six years has completed it. It requires a search to discover traces of the fire in the bright, modern metropolis at the Golden Gate. These instances are cited only as typical, not as unique. The spirit is the same throughout the entire territory, and even the smallest communities are performing feats proportionately as startling.

The reticent and reserved may take exception to the easy familiarity and blatant local pride of certain types; the ultra-conservative may deprecate the proclivity of certain others to deal continually in extravagant figures and superlatives; there are extremes of every type, and there is logical reason for such idiosyncracies. Speaking by and large, the man that the Coast develops is lovable, stimulating, and wholly admirable. He lives in the open air and sunshine, does big things in a big way, as a casual matter of course, and *he is not afraid.*

Thus we find, through those who speak for it, that the Pacific Coast faces the future with confident optimism. Proud of itself and of its past achievements, it nevertheless fully realizes its mistakes and is endeavoring to rectify them in the most reasonable manner. It seems to be a generally accepted fact, that further immediate development should be along the lines of production—the increasing creation of wealth. To those working intelligently, conscientiously, and persistently along this line, there is no section of our land that offers a more attractive field.

To the shirker there is nothing offered, west of the Rockies, other than the usual emolument accruing to the indifferent and inferior worker. To the average man, the Coast territory holds forth the certainty of a generous reward for earnest endeavor. But to him in whom lies, either latent or developed, the germ of true commercial greatness; who can think in more than eight figures, and build for more than a hundred years; the one man in ten thousand who may, perhaps, reclaim another Imperial Valley, or bridge another Great Salt Lake—to him there opens a field of limitless possibilities presenting problems and struggles to delight his soul. If he will go to the Coast and identify himself with it; permit the Coast to develop him along the lines that it does develop men; become inoculated with that indomitable spirit that fires those that dwell within its boundaries; make their people his people, and their God his God; take his share of the great work, and solve his share of the great problems; give to the Coast his best, unselfishly, and with true patriotism;—to him the Pacific Coast will return lavish measure of honor and gratitude, and, incidentally, the ransom of a hundred kings.

SEATTLE'S NEW SKYSCRAPER AND MOUNT RAINIER

THE CANAL AND THE PACIFIC COAST.

From a commercial point of view, the main object of undertaking such a work as the Panama Canal is, of course, the shortening of distances for oversea traffic. It is obvious that, given a line of steamships running between two ports, great benefit will arise if the distance to be traversed is halved or considerably reduced. Here it is proposed to make an attempt to estimate the effect of the Panama Canal upon the trade of the Pacific coast of the United States and Canada with Great Britain. The following figures show the saving of distances which will be made by English vessels and vessels of the east coast of the United States when making voyages to Pacific ports. Seattle is, of course, a United States port, but, as it is close to Vancouver, the figures relating to it may be taken as applying to Canada also:—

	New York.	New Orleans.	Liverpool.
To Seattle by Magellan.	13,953	14,369	14,320
To Seattle by Panama.	6,080	5,501	8,654
Distance saved	7,873	8,868	5,666

	New York.	New Orleans.	Liverpool.
To San Francisco by Magellan	13,135	13,551	13,502
To San Francisco by Panama.	5,262	4,683	7,836
Distance saved	7,873	8,868	5,666

Thus it will be seen that New York and New Orleans gain a much greater advantage than Liverpool. On the other hand, Jamaica and the other West Indian islands will be brought much nearer the Pacific coast, and, what is a far greater benefit, they will find themselves upon a main trade route instead of being, as hitherto, in a *cul-de-sac*.

From the commercial point of view, trade in the United States ports is the most important to Great Britain, not merely because of the volume of trade between the Western States and Great Britain which goes by sea, but because of the much larger population in the vast districts tributary to San Francisco compared with the population of Western Canada. The population of the three Pacific American States was over 4 millions in 1910, while more than 2½ millions were enumerated in the eight adjacent mountain States; whereas there were less than 1¼ millions in 1911 in the whole of British Columbia, Alberta, Saskatchewan, and the North-West territories. The following table shows, moreover, that though Canada's trade from the Pacific to this country is relatively large, it is now much smaller than from American ports:—

NET TONNAGE OF SHIPPING ENTERED AND CLEARED IN BRITISH PORTS FROM CANADA AND THE UNITED STATES IN 1912.

	Entered.	Cleared.
	Tons.	Tons.
Canada—		
Atlantic ports	2,688,448	2,578,993
Pacific ports	93,850	57,618
U. S. A.—		
Atlantic ports	8,451,803	8,806,192
Pacific ports	184,013	115,088

Thus the Canadian Pacific shipping is a larger proportion of the whole, but is not so large as our trade with San Francisco and Puget Sound.

The critical point, however, is not the amount of shipping that now passes between this country and the Pacific, but the amount that will do so when the Canal is open. And in this connection it should be pointed out that there has been a marked decline in shipping between this country and American Pacific ports, and this for two reasons. In the first place, the competition of trans-continental routes has no doubt diverted traffic from the slow journey round the Horn, and in the second, the export of Western American corn, which was the staple cargo of the old sailing ships from California to Liverpool, has been partially absorbed by the home market. In view of this latter consideration it is a very open question whether the shortening of the journey will succeed in attracting larger quantities of Californian wheat to Great Britain. Puget Sound is also the outlet for timber from the State of Washington, which produces more than any State of the Union, while California is easily the largest petroleum producer in the States. These two commodities are badly needed by this country, and though it is doubtful whether the tolls will be light enough to make it commercially feasible to bring lumber through the Canal, it is quite possible that California might send some of its oil *via* Panama. The trade, however, which is most certain to be stimulated by the shortening of the route is that in fruit, which is one of the chief products of the Pacific coast. The Canal will bring this fruit area as near by sea to the British market as is South Africa.

In the other hand, the growing population of these States affords a market for British goods which has been appreciably affected by the reduction of the tariff.

The effect that the Canal may have upon Canada is, naturally, of paramount interest to Englishmen. One of the main industrial features of the present time is the development of the western portions of Canada, and these are certain to make abundant use of the Canal. Recently, Dr. Vrooman read a paper before the Royal Colonial Institute in which he took a very sanguine view of the country and the advantages which it will derive from the Panama Canal. "Two thirds," he said, "of the future products of Canada are tributary to the western sea." There is no doubt that Alberta and Saskatchewan might easily produce five times as much grain as they are now doing, and may probably do so in the not distant future. Such an estimate is not merely an exercise of the imagination, as is too often the case in forecasts of alleged coming countries; the unoccupied lands are of exactly the same quality as the productive lands, and a stream of immigrants is pouring in; thus the production of Western Canada is certain to increase by leaps and bounds. It is estimated that Alberta has one hundred million of acres suitable for agriculture and less than three million are under cultivation. Saskatchewan, which is considerably larger than France, saw its population increase from 91,000 to 492,000 between 1901 and 1911. It has about eight million acres under cultivation. It is practically certain that these two provinces will ship their grain entirely from Pacific ports when the Canal is opened. Dr. Vrooman urges the people of Canada to be prepared for the vast increase of traffic which he believes is imminent. He estimates that to make adequate docks at Vancouver will take twenty years, and is anxious that works shall be at once begun of "sufficient dignity and importance." Unfortunately, the people of Vancouver do not seem to be awake to the situation. In contrast with this, the port of Los Angeles, which aims at be-

coming the leading port of the coast, has pledged itself to spend $18,000,000 on its harbour by 1918. But, whether the main traffic passes through the ports of Canada or North America, there can be no doubt that a large proportion of it will pass through the Panama Canal. Another circumstance may be noted; in 1912 only one sailing ship called at Vancouver, and thus practically none of its shipping is inseparably tied to the Magellan route.

San Francisco exports to Great Britain produce valued at £1,500,000 and much of this is likely to go through the Canal, especially as a considerable proportion consists of fruit, salmon, and other canned goods, which will be the better for a quick passage. The figure given above, of course, only refers to seaborne trade; by far the largest part of California's exports goes by land, and much of this will, in future, be railed to the Pacific and help to swell the Canal traffic. San Francisco will greatly benefit by the Canal. The last Consular Report says: "It is reported that various steamship companies—British, German, Japanese, and others—are making arrangements to run lines through the Panama Canal and make San Francisco one of their ports of call." It is also anticipated that a good many of the emigrants will arrive by Panama, thus avoiding the expensive railway journey from eastern ports. There is, in fact, every reason to expect that the Pacific coast of North America will contribute very largely to the traffic of the Panama Canal, which must inevitably depend for its success mainly upon San Francisco, Los Angeles, and Vancouver. At present the South American coast is not likely to do very much for it.

The competition of the Magellan route will remain, and doubtless will be formidable in the case of lumber and other bulky articles, but the distance is so enormous that Panama can hardly fail to have the preference in most cases, provided that the Canal tolls are reasonable. As regards Oriental ports, the Suez Canal will be, in some sort, a competitor. The Panama Canal will only bring New York 350 miles nearer to Hong Kong, while Great Britain is 1,600 miles nearer that port via Suez than via Panama. So far as the frozen meat trade from Australasia is concerned, shipowners declare that they will make no change in their arrangements in spite of the saving of distance by coming via Panama; for they prefer the colder, and consequently cheaper, route. The Canal route from the Antipodes involves a long slanting journey through the tropics, whereas the route from New Zealand via the Horn takes the shortest possible route across the equator. Since logs of most ships show that when water is entering the ship at 84 degrees F. the refrigerating machinery has to be kept going for 12 to 15 hours a day, against 9 hours a day when the water is entering at 57 degrees F., it is clear that the new route would involve additional expense in addition to the tolls levied for the use of the Canal itself.

Again, a formidable competitor will be the Tehuantepec Railway, which, opened in 1907, runs from Puerto, Mexico, in the Gulf of Mexico, to Salina Cruz, on the Pacific. The through traffic on this line is rapidly increasing, and now amounts to over 700,000 tons yearly. It carries more than double the freight of the Panama Railway, and the figures of the latter are swollen by Canal material, which will soon cease. The following figures show the difference between the Mexican and the Panama routes:—New York to San Francisco, *viâ* Mexico, 1,173 miles shorter; Liverpool to San Francisco, *viâ* Mexico, 609 miles shorter; New Orleans to San Francisco, *viâ* Mexico, 1,767 miles shorter. But as regards many kinds of merchandise, the Mexico route is likely to compete successfully with the Canal. A writer in the *Economic Journal* estimates the annual cost of the Canal, including sinking fund, at 21 million dollars. "A liberal estimate of receipts from tolls, based on the tonnage of vessels which might have used the Canal in 1909-10, had it then been in existence, places the revenue at something over $6,000,000 per annum. Therefore, even without taking into account any increase in operating expenses with increased tonnage, the business of the canal must grow to three and a half times the estimated volume of 1919-10 before a profit can be realised." At one time a far more gloomy view was taken of the probable receipts. The eminent United States traveller, Colonel Church, speaking before the Royal Geographical Society, said: "I may say that, with a year of labour, I analysed all the commerce that would possibly go through the Canal if it were open to-day, and I could not make it a million tons." Certainly, this is an underestimate, but it is important to notice the contentions that only 6 per cent. of the area of South America lies on the Pacific slope of the Andes, and that the North American railways may be able to carry freight as cheaply as a ship can carry it from San Francisco to New York by way of Panama. The Canal also will be handicapped, and the United States will be handicapped in their use of it, as long as their mercantile marine continues on its present small scale. Mr. Vaughan Cornish has remarked: "There is at present some ground for the extreme opinion sometimes expressed in the United States that the Canal is being built with American money for the use of Europe—and, one may add, of Japan."

The Canal, in all probability, will disappoint many expectations, for it is such a great work that great results are expected from it, and these can hardly be expected under the present conditions; there must be material to work upon. It should be remembered that a mere saving of distance is not enough to make a waterway successful. To compare small things with great, the Corinthian Canal is little used, although it effected a very considerbale saving of distance. But the Canal will have the advantage of serving, in Western Canada, a country which must be one of the chief granaries of the world, and cannot fail to grow very rapidly in population and productiveness. Whereas Panama is not now on a trade route, unless the comparatively insignificant one from San Francisco to Valparaiso may be so described, it will hereafter stand on the convergence of two routes—that from Europe and that from New York—and these two will radiate from Panama into the Pacific to the north and south coasts, and also to Japan, China, and Australasia. It may be long before the tolls become remunerative, but its immediate effect upon commerce will be stimulating, and eventually the Isthmus is likely to become one of the busiest resorts of shipping upon the face of the globe.

THE PANAMA CANAL

The Panama Canal—Its History and Construction

By ISHAM RANDOLPH, C.E., D.E.

Member of the Board of Consulting Engineers for the Panama Canal. Member of the Advisory Board of Engineers 1909. Chief Engineer of the Chicago Drainage Canal During Entire Period of Construction 1893 to 1907. Consulting Engineer 1907 to 1913.

The Panama Canal is an accomplished fact! A section has been torn from the backbone of the Isthmus and the shores, which since time began have stayed the proud waves of the Atlantic of the North and held back the swelling tides of the Pacific on the South, have been cleft to receive the sweet waters of an inland sea, pent up by man and by him to be loosened at his pleasure. The Chagres River is a submissive captive and the way from ocean to ocean has been shortened for the toilers of the sea by eight thousand four hundred and nineteen miles.

Such is the fact but there remains an antecedent history to that fact, and a part of that history is dependent upon "the testimony of the rocks" which testimony the geologists assume to read and impart the facts to their lay brethren. But there are "faults" in rocks and it follows that if there be faults in the text, there must be faults in its rendering by the savant who undertakes it. I think that the rocks of Panama have baffled the geologists and kept their age old secrets and will keep them until time shall be no more. Only "He who knoweth all things" can tell when and how there came to be the narrow strip of land which serves as a bridge joining the two continents of America.

We know that it exists and white men found it out only 422 years ago. And when they found the Isthmus they found it inhabited by a people of different hue and different characteristics, and today we no more know how these people came to be upon it than we know how the Isthmus came to be a barrier between the world's greatest oceans.

He who essays to write history which antedates his own existence, or if it be contemporaneous and not coming within his personal knowledge, is dependent upon what others have written or what they have told him, for what he accepts as historic fact and records as truth to be accepted by those who come after him. The historian should be a delver after truth; old archives should be studied and the weight of evidence carefully considered in the light of reason and of probability before ancient history is presented to modern credulity and modern history should stand the test of rigid cross-examination; its witnesses should have their veracity tested by the most rigorous standards.

But some who write of history need not be historians in the strict sense of the term, for the work has often been so well done by others that he can "reap where he has not sown" and gather of the harvest made ready for him, and that is my fortunate situation with regard to all the ancient and some of the modern history of Panama.

For the purposes of this paper, ancient history long drawn out is unessential but ancient history epitomized meets its needs fully; and most admirably have these needs been anticipated by the report of the Isthmian Canal Commission of 1899-1901, Chapter 2, pages 18 to 43. But much

THE FIRST STEAMER TO PASS THROUGH THE PACIFIC LOCKS.

of what is there recorded is irrelevant and beyond the scope of this paper.

Moreover, if the facts of the text can be presented in fewer words to meet our need, that economy in language will be practiced.

"When Columbus left Spain in 1502, on his fourth and last voyage, his intention was to go still further westward and endeavor to find a strait that would lead to India. He would thus complete his great discovery and demonstrate the correctness of the theories upon which his expeditions had been undertaken. He reached Honduras and followed the coast line to Darien, but long-continued and severe storms, the hostile attitude of the Indians, and the discouragement of his followers interfered with his plans and progress, and with sorrow and regret he turned toward Hispaniola with his shattered ships before he had accomplished the long-hoped-for result, in which, however, his faith was not abated. When he died on the 26th of May, 1506, he was still fully satisfied that his discoveries were in the eastern part of the Old World, and never fully realized the extent and grandeur of his achievements."

The early discoverers were all searching for a strait giving direct passage to the East (Cathay).

Finally they came to the realization of the fact that a new world had been discovered and the strongest confirmation of this fact was afforded "in September, 1513, by Vasco Nunez de Balboa, then governor of a province in Darien known as Castilla del Oro," who organized an expedition to go in search of a "great sea, beyond the mountains," of which the Indians had told him.

"He crossed from Santa Maria de la Antigua, the capital of his province, a city founded in 1509 or 1510, near the Atrato River, to a point near Caledonia Bay, where Acla was afterwards built; thence he proceeded with a considerable force of Spaniards and Indians across the divide, and on the 25th day of the month reached a high ridge above the gulf which he named San Miguel. Advancing beyond his companions to a favorable elevation, he was the first European to behold the great ocean to the south, which he called the South Sea, from the direction in which he viewed it." "Four days later he entered the sea and with great ceremony claimed it by right of discovery for his royal master, the King of Spain."

The narrative goes on to tell of Balboa's ambition to discover yet more lands; how he caused the timbers for four brigantines to be framed on the Atlantic coast; how he compelled the natives to transport these timbers to the Pacific Coast; how the first lot of timbers was swept away by flood; how he again caused the timbers for four brigantines to be framed on the Atlantic coast and transported by the natives to the Pacific to be successfully framed and launched. This was cruel and deadly work for the Indians and "Bishop Quevado testified before the Spanish Court that 500 poor wretches perished in this work, while Las Casas says the deaths were nearer 2,000 in number." But Balboa was superseded by Pedro Arias de Avila, better known as "Pedrarias." The jealousy of the supplanter caused him to charge Balboa with treasonable conduct and after a form of trial he was condemned and beheaded in the latter part of 1517. Thus was meted out to him the decree promulgated after the ark rested on Mount Ararat, "Whoso sheddeth man's blood by man shall his blood be shed."

The city of Panama was commenced in August, 1517, and in September, 1521, it was made a city by royal decree, with special privileges and a coat of arms. It became the Pacific terminus of a line of posts and a road was at once constructed via Cruces on the Chagres River to Acla, which was the Atlantic port until the distinction and the profit was, in 1597, transferred to Porto Bello. This highway was paved and, according to some accounts, it was only wide enough for riders and beasts of burden, but Peter Martyr says that two carts could pass one another upon it.

"The value of this interoceanic communication increased every year. After the conquest of Pizarro vast quantities of gold and silver were brought from the mines of Peru to Panama, carried across the Isthmus on the King's horses, kept for that purpose, and transported from the eastern terminus of the paved way in royal galleons to Spain."

"The importance of a maritime connection and the discouraging results of the efforts to discover a natural channel between the two oceans suggested to many minds the idea of a ship canal. * * * According to one authority, Charles V. directed that the Isthmus of Panama be surveyed with this purpose in view as early as 1520. In February, 1534, a royal decree was confirmed directing that the space between the Chagres and the Pacific be examined by experienced men, and that they ascertain the best and most convenient means of effecting a communication between the navigable waters of the river and the ocean and the difficulties to be met in the execution of such a project. The Governor, Pascual Andagoya, reported that such a work was impracticable, and that no king, however powerful he might be, was capable of forming a junction of the two seas or of furnishing the means of carrying out such an undertaking."

Enough history has now been quoted to show that the seed of the Panama Canal was sown 394 years before the canal bloomed into existence. Was there ever another aquatic plant of such slow growth?

The City of Panama was captured by Sir Henry Morgan in February, 1671, and on the 24th day of that month it was burned. Two hundred and forty-one years and one day later the present writer saw the ruins and took pictures of some of them.

The present city of Panama occupies a site about seven miles west of the original city and it was commenced January 21st, 1673. This I learn from the "Canal Zone Pilot."

But to return to my text book. On page 28, I read:

"No actual progress in the way of establishing a maritime communication from the Atlantic to the Pacific had been made during the three hundred years of Spanish occupation. Baron Von Humboldt, who visited New Spain about this time and took a great interest in this subject, deplored the lack of accurate knowledge of the physical features of the isthmian country. * * * The publications of Humboldt were extensively read and revived the interest of the commercial nations of the world in this subject. The Spanish Cortes was aroused to action and in April, 1814, passed a formal decree for the construction of a canal through the peninsula for vessels of the largest size and provided for the formation of a company to undertake the enterprise, but it led to no results and Spain's opportunities to obtain the glory of opening this great highway for the commerce of the world terminated in 1823 when the last of her Central and South American provinces succeeded in establishing their independence."

I could go on quoting from the chronicles to which I have resorted for my ready made history many interesting statements but I do not think it well to burden this paper with a record of all of the abortive attempts to bring about the building of an Isthmian Canal between 1814 and 1869: and I only resume at the latter date because the data about that period gathered by Commander Selfridge and reported to the Congress of the United States were brought to my attention some time in the mid-nineties.

The demand for transportation facilities across the Isthmus became so imperative that capitalists determined to build a railroad and reap the harvest which their shrewdness foresaw. In May, 1847, one Mateo Kline secured

a franchise for such a railroad and in December, 1848, this franchise was transferred to Aspinwall, Stephens and Chauncy who, with their associates, organized the Panama Railroad Company, commenced work in 1849, and opened the road for traffic early in 1855. The Atlantic terminus on Limon Bay was Aspinwall—later the name was changed to Colon—and the Pacific terminus was Panama. The length of the road was 47¾ miles. Tradition has it that in building this railroad, a life was sacrificed for every cross tie in it, so great was the mortality among the workmen. Were this tradition true, it would mean that the road cost about 150,000 human lives in the six years spent in building it. In flat contradiction of the tradition is the fairly well authenticated fact that at no time were more than eight thousand men employed in building the road. It is interesting to note that the ties used in building the Panama Railroad were of lignum vitae, and that they were still in use after nearly sixty years' service when the rising waters of Lake Gatun buried them from sight.

In 1869 General Grant became President of the United States and in his first message to Congress "commended an American canal on American soil to the American people."

"Congress promptly responded to this sentiment by adopting a joint resolution providing for further explorations of the isthmus by officers of the Navy, and Admiral Ammen, as Chief of the Bureau of Navigation, was authorized to organize and send out expeditions for this purpose. In March, 1872, a further resolution was adopted for the appointment of a commission to study the results of the explorations and to obtain from other reliable sources all available information regarding the practicability of the construction of a canal across the American continent. The President appointed on this Interoceanic Canal Commission Gen. A. A. Humphreys, Chief of Engineers, United States Army; C. P. Patterson, Superintendent of the Coast Survey, and Commodore Daniel Ammen, Chief of the Bureau of Navigation of the Navy."

In February, 1876, "after long, careful and minute study of the several surveys of the various routes across the continent," this Commission reported

"that the route known as the 'Nicaragua route' beginning on the Atlantic side at or near Greytown; running by canal to the San Juan River; thence * * * to * * * Lake Nicaragua, from thence across the lake and through the valleys of the Rio del Medio and the Rio Grande to * * * Brito, on the Pacific coast, possesses, both for the construction and maintenance of a canal, greater advantages and offers fewer difficulties from engineering, commercial and economic points of view than any one of the other routes shown to be practicable surveys sufficient in detail to enable a judgment to be formed of their respective merits.

This report was not transmitted to Congress until April, 1879, when it was called for by a resolution of the Senate. It is in print as "Senate Ex. Doc. No. 15 46th Congress, First session."

Having back of him French support, Lieut. L. N. B. Wyse, in May, 1876, entered into a contract with the Columbian Government to build a canal across the territory of the Republic. In May, 1878 this contract was so modified and extended as to give the promoters the exclusive privilege, for a period of ninety-nine years, of constructing the canal covered by the original contract without any restrictive stipulations other than those safeguarding the rights and property of the Panama Railroad. The general route of the proposed canal was to be determined by an international congress of engineers to be assembled not later than 1881.

Accordingly, the International Scientific Congress convened in Paris in May, 1879, with a membership of 139 and their decision was in favor of the route from Colon (Aspinwall) to Panama.

The Wyse concession was transferred to "La Compagnie Universelle du Canal Interoceanique de Panama," better known in the United States as the Panama Canal Company. Ferdinand de Lesseps was President. The Wyse concession was purchased from its holders by this new company with the high sounding name for 10,000,000 francs. The purchasers then proceeded to sell 600,000 shares of stock of 500 francs each.

Two years were devoted to surveys and examinations and preliminary work. The plan adopted was for a sea level canal 72 feet wide on the bottom and a navigable depth of 29.5 feet. The volume of excavation computed for this canal was 157,000,000 cubic yards. The center line elevation at the summit of the Culebra cut was 333 feet above the sea level. The cost of this plan as estimated by DeLesseps in 1880 was $127,600,000.00 and the time required for construction was given as eight years. Work on this project continued until 1887. By that time DeLesseps had to admit a fact, which had long been manifest to others, namely; that with the resources available, the canal could not be carried through at the sea level. A provisional change was made to a lock type of canal for which the water for the summit level was to be provided by pumping. Work under this plan was carried on until 1889 when the company became bankrupt and was dissolved by a judgment of the "Tribunal Civil de la Seine" on February 4th of that year and a liquidator was appointed by the court to take charge of its affairs. The liquidator gradually reduced the force employed and suspended work May 15th, 1889.

He thereafter appointed a "Commission d' etudes" composed of eleven Frenchmen and foreign engineers with Inspector General Guillemain, director of the Ecole Nationale des Ponts and Chaussees, at its head. The Commission made a study of the entire project and on May 5th, 1890, submitted a plan for a lock canal which they estimated would cost $112,500,000.00 to complete and suggested that to cover the cost of administration and financing, this estimate should be increased to $174,600,000.00. The old company and the liquidator had by sale of stocks and bonds raised $246,706,431.68. The face value of the securities issued to raise this money was $435,559,332.80. The number of persons holding these securities was over two hundred thousand. There had been excavated in all about 72,000,000 cubic yards and there had been purchased and transported to the Isthmus an enormous quantity of machinery and other equipment valued at $29,000,000.00. The scandals connected with the old company led to the prose-

cution and conviction of DeLesseps and other prominent persons.

In 1894, the New Panama Canal Company was organized and took over all of the canal property except the Panama Railroad shares which were held for its benefit. Work was resumed on a small scale and continued until June 30th, 1899, by which time the additional excavation amounted to about 5,000,000 cubic yards and the additional expenditures to about $7,000,000.

The interest of the United States in an Isthmian Canal was manifested by an act of Congress, approved March 3rd, 1899, authorizing the President to appoint that Commission from whose report I have quoted. The men selected by President McKinley for this important task were: John G. Walker, Rear Admiral, United States Navy, President; Samuel Pasco; Alfred Noble; George S. Morrison; Peter C. Hains, Colonel United States Corps of Engineers; William H. Burr, O. H. Ernst, Lieut. Colonel, United States Corps of Engineers; Lewis M. Haupt; and Emory R. Johnson.

The members of the Commission convened in Washington on June 15th, 1899, and immediately began the work for which they were appointed. The scope of their investigations embraced the following subjects:

1. The Nicaragua route.
2. The Panama route.
3. Other possible routes.
4. Industrial, commercial and military value of an interoceanic canal.
5. Rights and privileges.

Later in the division of the duties, number one was assigned to Mr. Noble, Mr. Burr and Colonel Hains; number two to Mr. Burr, Mr. Morrison and Lieut.-Col. Ernst; number three to Mr. Morrison, Mr. Noble and Col. Hains; number four to Mr. Johnson, Mr. Haupt and Mr. Pasco; and number five to Mr. Pasco, Lieut.-Col. Ernst and Mr. Johnson.

To follow these gentlemen through the ramifications of their researches would be to transcribe their report which will not be attempted and only very prominent features of it will be noted.

At a very early stage of their activities, the Panama Canal became prominent. The new Panama Canal Company made overtures looking to a sale of their bankrupt enterprise. The Commission visited Paris, sailing from New York, August 9th, 1899. Upon reaching Paris, the Canal Company displayed its wares, giving the Americans free access and every facility for examining maps, plans, profiles and all other data relating to the Canal, of which it was possessed. Mr. Maurice Hutin, the Director General, and Mr. L. Choron, the chief engineer, as well as the other officers of the company, extended every courtesy to the visitors and afforded all needed assistance. A special meeting of the Comité Technique was also called to give the Commissioners such oral explanations as they might desire. After making all needed investigations the Commission returned to New York, sailing from an English port on September 29th, 1899.

On January 6th, 1900, the Commission sailed from New York for Greytown, Nicaragua.

As the outcome of its studies, the Commission submitted its report to the President under date of November 16th, 1901. This report presents estimates of quantities and cost of four "other possible routes" but concentrated its work on the Panama and Nicaragua routes. The other possible routes and their estimates of cost were:

The Sassaedl route	$263,340,000.00
Aglaseniqua route	283,440,000.00
Caledonia route	320,040,000.00
San Blas route	289,770,000.00

I will digress here to make a few personal statements in regard to the San Blas route, or as it was first named to me prior to the submission of this report, the Darien Mandinga route. About the year 1896 during the construction period of the Chicago Sanitary & Ship Canal, a Chicago attorney, named Bliss, called on me and told me that he had become much interested in reading Commodore Selfridge's report on his Isthmian Canal investigations and he asked me if I thought a ship tunnel, such as Selfridge suggested, seven miles long was practicable. I told him that my answer would depend upon the character of the material through which the tunnel was to be bored. He could not tell me what material would be encountered.

Later on, Capt. Robert Wainwright of the First United States Cavalry, called on me one morning and introduced his father-in-law, General Charles Serrell, a retired engineer officer, who was desirous of seeing our work. I took them both over the work and they were greatly interested. As we were returning to Chicago, General Serrell said to me: "I will tell you now why I wanted to meet you. I wish to talk with you about a sea-level canal." "Yes," said I, "a sea-level canal with seven miles of tunnel on it." He seemed surprised and asked what I knew about it. I told him of my talk with Mr. Bliss. "Well," he said, "I can tell you what the mountain is made of; it is granite and the length of the tunnel will be only four and a half miles; and the distance from tide water to tide water only twenty-one miles." He went on to say that he had in his possession the notes of the survey made for and at the cost of Mr. Frederick Kelley of New York and these notes he wished to submit to me and have me examine them. He did submit them to me and they were in good preservation and had all the ear-marks of authenticity. I also went over estimates of quantities and unit prices applied to the work.

General Serrell enlisted the active sympathy of Senator Scott of West Virginia and Mark Hanna. I corresponded with Senator Scott in regard to the matter but had no communication with Senator Hanna. Both Senator Scott and General Serrell advised me that they had aroused President McKinley's interest in the project. The President died, Mark Hanna died, and the last time I saw Senator Scott he was still firm in his conviction that the government had made a mistake in not taking up this project.

To go back to the report of the Commission, from page 51, I quote:

"The Kelley examination, starting from the Pacific, was carried with level and transit up the Chepo and Mamoni rivers across the summit to a point on the Carti, following the valleys of these streams. The Selfridge surveys, starting from the Atlantic side, were carried with level and transit up the Mandinga River, across the divide, and up the Nercalagua River nearly to the divide, while barometrical reconnaissances were made up the Carti River overlapping the Kelley survey. This is the narrowest place on the Isthmus, it being less than thirty-one miles from shore line to shore line and only about two-thirds of this distance from the Atlantic to tide water in the Chepo River. Furthermore, the Pacific harbor is quite as good as that at Panama, while Mandinga Harbor, in the Gulf of San Blas, at the northern end of the route, is all that could be desired."

The Commission, in investigating the cost of the San Blas project, figured the tunnel at $22,500,000 per mile, an estimate far exceeding my own computations. They used a unit price of $5.00 per cubic yard for excavation, which would be all right for headings, but the great bulk of the excavation should be done for about $2.00 per cubic yard. They figured on lining the entire tunnel with concrete five feet in thickness, estimated to cost $10.00 per cubic yard.

However, even at the excessive unit costs applied in the Commission's report, the cost of the San Blas route would have been close to $100,000,000 less than the cost of the Panama Canal has proven to be. The question would be debatable as to the comparative merits of 4.5 miles of ship tunnel and 1.54 miles of locks. If the world should need another canal across the American Isthmus, the San Blas route would be very tempting, and owners of a canal at sea level with a tunnel of 4.5 miles and a total length of twenty-one miles from tide water to tide water might justify a claim of superiority for their waterway over our waterway of thirty-five miles from tide water to tide water with an intermediate stretch of water elevated eighty-five feet above the sea level.

With this brief digression, I will resume the narrative derived from the report of 1899-1901. That report disposes of "other possible routes" and concentrates on Nicaragua and Panama. On page 173 of the Report, they make a comparison of these rival routes:

"The total length of the Nicaragua route from sea to sea is 183.66 miles, while the total length of the Panama route is 49.09 miles. The length in standard canal section and in harbors and entrances is 73.78 miles for the Nicaragua route and 36.41 miles for the Panama route. The length of sailing line in Lake Nicaragua is 70.51 miles, while that in Lake Bohio is 12.68 miles. That portion of the Nicaragua route in the canalized San Juan is 39.37 miles. The preceding physical features of the two lines measure the magnitude of the work to be done in the construction of waterways along the two routes."

On a previous page is this statement:

"The Nicaragua route has no natural harbor at either end. At both the Atlantic and Pacific termini, however, satisfactory harbors may be created by the removal of material at low unit prices and by the construction of protective works of well-established design. An excellent roadstead, protected by islands, already exists at Panama and no work need be done there, either for harbor construction or maintenance. At Colon, the Atlantic terminus of the Panama route, a serviceable harbor already exists.

On page 174, we find this summation of costs:

"The cost of constructing a canal by the Nicaragua route and of completing the Panama canal without including the cost of acquiring the concessions from the different governments is estimated as follows:

Nicaragua $189,864,062.00
Panama 144,233,358.00

For a proper comparison, there must be added to the latter the cost of acquiring the rights and property of the New Canal Company. This Commission has estimated the value of these in the project recommended by it at $40,000,000.00."

In the chapter devoted to maintenance and operation, the Commission arrives at the conclusion that this charge will be for

Nicaragua route .....$3,300,000 per annum
Panama route ..... 2,000,000 per annum

Covering the negotiations with the officials of the New Panama Canal Company, this statement is presented:

"Much correspondence and many conferences followed, but no proposition naming a price was presented until the middle of October, 1901, and after a prolonged discussion, it was submitted to the Commission in a modified form, on the 4th of November, to be included in its report to the President. The itemized statement appears in an earlier chapter of the report. The total amount for which the company offers to sell and transfer its canal property to the United States is $109,141,500.00. This added to the cost of completing the work makes the whole cost of the canal by the Panama route $253,374,858, while the cost of the Nicaragua route is $189,864,062, a difference of $63,510,796 in favor of the Nicaragua route. In each case there must be added the cost of obtaining the use of the territory to be occupied and such other privileges as may be necessary for the construction and operation of the canal in perpetuity. The compensation that the different states will ask for granting these privileges is now unknown."

The final recommendation is stated thus:

"After considering all of the facts developed by the investigations made by the Commission and the actual situation as it now stands, and having in view the terms offered by the New Panama Canal Company, this Commission is of the unanimous opinion that 'the most practicable and feasible route' for an isthmian canal to be 'under the control, management and ownership of the United States' is known as the Nicaragua route."

This report was transmitted to Congress December 4th, 1901.

But there was to be a sequel to this report. The New Panama Canal Company realized that if the United States should build the Nicaragua Canal, the last chance of securing salvage from its wreck would be gone and its officers lost no time in opening up negotiations with the Commission, the result of which was that on January 18, 1902, the Commission addressed a further communication to the President of the United States, the first sentence of which reads: "Sir: The Isthmian Canal Commission has the honor to submit the following report upon the proposition of the New Panama Canal Company to sell and dispose of all of its rights, property and unfinished work to the United States for $40,000,000." This was the salient feature of the supplemental report and it sealed the fate of the Nicaragua canal. The President transmitted the report to the United States Senate.

A description of the prominent features of the canal which this Commission proposed to build at Panama will be deferred until other historic events become a part of this narrative; but before taking leave of the report of 1889-1901, its value to the historian should be pointed out. With its text and its appendices, it fills a volume of 681 printed pages and it treats of such a variety of correlated subjects that it may well be regarded as exhaustive in its discussion of interoceanic canals.

The act of Congress under which the commission, from whose report we have quoted so freely, was appointed was no doubt prompted by an event which aroused the American people to the need of an "American canal on American soil for

American people." That event was the voyage of the United States man-of-war "Oregon," which sailed from San Francisco on the 19th of March, 1898, and dropped anchor at Key West May 24th. She had steamed 14,000 miles in sixty-eight days, was in fighting trim at the end of the voyage and was able to take a prominent part in the destruction of the Spanish fleet under Cervera on July 3rd, 1898. Had the Panama canal been completed when the "Oregon" made this voyage, her distance travelled would have been reduced 8,415 miles and her time reduced thirty-eight days, but a splendid bit of naval history would not have been written.

An Act of Congress, approved June 28th, 1902, empowered the President to purchase from the New Panama Canal Company all of its rights and properties enumerated in the report rendered by the Commission on January 18th of that year at a cost not in excess of $40,000,000, provided a satisfactory title could be obtained. The President was further authorized to acquire from the Republic of Colombia, upon reasonable terms, a strip of land across the Isthmus not less than six miles wide; "the control of this right of way by the United States to be perpetual and the right to construct the canal within the boundaries of this strip from the Caribbean sea to the Pacific Ocean." The proposed canal to be "of sufficient capacity and depth as shall afford convenient passage for vessels of the largest tonnage and greatest draft now in use, and such as may reasonably be anticipated" with all necessary locks and other appliances as well as safe and commodious harbors at the termini and suitable provision for defense. The sum of $10,000,000 was appropriated and the President was directed to "cause contracts to be entered into for the construction of the canal, its harbors and defenses, limiting the additional expenditure to the sum of $135,000,000, to be met by future appropriations." The act also called for the creation of an Isthmian Canal Commission to be composed of seven members.

CONE OF LEAPING WATER. GATUN SPILLWAY.

DETAIL OF CONSTRUCTION WORK.

A treaty was negotiated by Mr. John Hay, Secretary of State, with Mr. Herran, representing the government of Colombia, under the terms of which the United States would acquire the right to construct the canal. This treaty was ratified by the United States, but on August 12th, 1903, was rejected by the Colombian Congress. The Department or State of Panama had long been straining at the tether which held it to Colombia, as frequent attempted revolutions had shown. The year 1902 had been one of internecine strife; one incident of which was the sinking in the Bay of Panama by the insurgents of the Colombian gun boat "Lautaro." The government's chief military representative on the Isthmus, General Carlos Alban, went down with the ship. One mast of this vessel was still visible above the surface in 1909. The strife of 1900-1902 terminated on the 21st of November 1902, when a treaty of peace between the government and the "Liberals" was signed on board the United States bat-

tle ship "Wisconsin" in the harbor of Panama.

With such a history as a background, it is easy to understand the alacrity with which the citizens of Panama seized what seemed to be the psychologic moment to throw off the yoke of Colombia, as was done on November 3rd, 1903. The fullest account of the events preceding the secession of Panama to which I have had access, is found in the "Canal Zone Pilot" on pages 233-35. The names of the men in the junta who engineered the movement are given and it is stated that in the last days of August they held a meeting in New York. It is also stated that one of the junta, Mr. J. Gabriel Duque was sent to Washington and what purports to be an interview with Mr. Hay, Secretary of State, is given. Mr. Hay is reported to have said among other things, "Of course, you understand that if there is a revolution, the United States will keep the Isthmus open and allow no fighting near the railway. If there is to be any, it will have to be done before our marines get there." Whatever the precedent facts may have been, when the revolution occurred, the United States Navy was represented at Colon by the S. S. "Nashville"—Commander John Hubbard — which arrived November 3rd. One hundred and ninety-two men, said to be all he had, served to keep the peace and on November 5th the Colombia troops, five hundred strong, whose arrival on November 3rd on a chartered steamer and a Colombian gun boat is described in the "Canal Zone Pilot," evacuated the Isthmus. The officers in command of this repressive expedition went to the City of Panama directly after landing at Colon. These officers, Generals Tovar and Amaya, were received with military honors, disguising the trap into which they had hastened, and that afternoon they were arrested and imprisoned, but they were released in time for their return to Colombia with their commands. The new Republic was recognized by the United States on November 6th, 1903, just three days after the revolution was started.

Mr. Philippe Bunau-Varilla was designated by the new Republic as its envoy extraordinary and minister plenipotentiary to the United States, and a treaty known as the Hay-Bunau-Varilla treaty was negotiated, ratified by the Republic of Panama December 2nd, 1903, and by the United States on the 23rd of the following February. Under this treaty, the United States acquired in perpetuity possession of a zone of territory extending across the Isthmus, ten miles in width, five miles on each side of the center line of the canal. Like control and use was also granted for any other lands or waters outside of the zone which might become necessary or convenient for the work. For the property and rights so conveyed, the payment by the United States was $10,000,000 and a further annual payment to begin nine years after the ratification of the treaty, of $250,000.00. On April 23rd, 1904, the stockholders of the New Panama Canal Company formally authorized the sale of the Company's property to the United States for the sum of $40,000,000. The transfer of this property was made May 4th, 1904, to Lieut. Mark Brooke, Corps of Engineers, U. S. A., detailed for that duty.

The President appointed the Isthmian Canal Commission authorized by the act of June 28, 1902, and the Commission held its first meeting March 22, 1904. The members of this Commission were:

Rear Admiral John C. Walker, U. S. Navy (Retired), Chairman.
Major General George W. Davis, U. S. Army (Retired).
Mr. William Barclay Parsons, C. E.
Mr. William H. Burr, C. E.
Mr. Benjamin M. Harrod, C. E.
Mr. Carl Ewald Grunsky, C. E.
Col. Frank J. Hecker.

On May 6th, Mr. John F. Wallace was appointed Chief Engineer. He assumed his duties June 1st.

On May 9th, the President, through the Secretary of War, placed the government of the Canal Zone in charge of the Commission with power to enact and enforce such laws as in its judgment were required to insure order and justice. He appointed Major General George W. Davis, Governor.

When the transfer of the New Panama Canal Company's properties was made that company had about seven hundred men at work. The Commission decided to continue the work then in progress and to increase the force gradually. The most vital question confronting the Commission was that of health. During the French occupation, the mortality among employees had been appalling.

Col. William C. Gorgas had been so successful in producing sanitary conditions in Havana during the American occupation that he was selected to carry on a like work in the Zone.

Omitting the details of alignment, the lock canal planned by the Commission of 1899-1901 may be concisely described as follows:

Total length from six fathom line in Limon Bay to deep water in Panama Bay, 49.09 miles.

Subdivision of Channel	Description	Miles	Cost
Colon entrance and harbor	500 ft. wide side slope 1 on 3	2.39	$ 8,057,707
From Harbor to Bohio Locks	Width 150 ft.	14.42	11,099,839
Bohio Locks	2 lifts, double flight, 84' wide, 740' long, 35' deep over miter sill	.35	11,567,275
Lake Bohio	Elevation 85' above mean tide area 38.5 sq. mi.	13.61	2,952,154
Obispo gates	Designed for use in case of need to drain Culebra cut.		295,434
Culebra section	Bottom width 150' side slopes 1 on 1	7.91	44,414,460
Pedro Miguel Locks	2 lifts, double flight 84' wide, 740' long, 35' deep over miter sills	.35	9,081,321
Pedro Miguel Level	Elevation of water 28' above mean tide	1.33	1,192,286
Miraflores Locks	1 lift, 84' wide, 740' long, 35' deep over miter sill	.20	5,781,401
Pacific Level	For 4.12 mi. 150' wide, to LaBoca 200' wide, 4. 41 mi	8.53	12,427,971
Bohio Dam	Earth dam with core wall, top 100' above sea level		6,369,640
Gigante Spillway	Concrete dam 2,000' long, crest at elevation 85'		1,209,419
Pena Blanca outlet	Artificial channel discharging into Aqua Clara swamp		2,448,076
Chagres diversion	Artificial channel		1,929,982
Gatun diversion	Artificial channel		100,000
Panama Railroad diversion			1,267,500
		49.09	$120,194,465
Engineering, police, sanitation and general contingencies, 20%			24,038,893
	Aggregate,		$144,233,358

The Gigante Spillway scheduled above was to pass the surplus flood waters from Lake Bohio into the Pena Blanca swamp. From this swamp the surplus waters were to flow via the Pena Blanca outlet into the Aqua Clara swamp from which swamp they will flow on through other swamps and outlets to the sea.

The project thus epitomized in description was ready for adoption by the newly appointed Isthmian Canal Commission. This Commission seems to have been an inharmonious organization, judged by the resignations which were soon in order. Col. Hecker resigned November 16, 1904, and all the other members tendered their resignations to take effect at the pleasure of the President. A new Commission was appointed and entered upon its duties April 1st, 1905. The new members were: Mr. Theodore P. Shonts, Chairman; Mr. Charles E. Magoon, Governor of the Canal Zone; Mr. John F. Wallace, Chief Engineer; Rear-Admiral M. T. Endicott, U. S. Navy, Chief of the Bureau of Yards and Docks; Brig. General Peter C. Hains, U. S. Army (Retired); Col. O. H. Ernst, Corps of Engineers, U. S. Army; and Mr. Benjamin Harrod. Mr. Wallace and Mr. Harrod were the only hold-overs from the first board.

During the period between the appointment of the first board and the accession to power of their successors, a strong sentiment in favor of the sea-level type of canal had sprung up. This sentiment was fostered by the Chief Engineer, Mr. John F. Wallace, who had convinced himself of the practicability of constructing a seal level canal. Mr. Wallace resigned June 13, 1905. Mr. John F. Stevens was chosen to succeed him on July 1st, 1905, and immediately entered upon a vigorous discharge of his new duties.

Meantime, Colonel Gorgas had been most assiduous in his efforts to safeguard the health of the inhabitants of the Canal Zone. His war against every unsanitary condition and his effort to exterminate the deadly stegomyia mosquito, as well as the less deadly but still dreadful anopheles branch of the mosquito family, soon produced results. Waters troubled by mosquitos were oiled, swamps were drained, cisterns screened, until a plentiful supply of pure water, drawn from government reservoirs, was distributed over the isthmus through mains and laterals laid by government engineers. The domestic sources of water supply and disease were then done away with. Houses were fumigated, renovated and thoroughly screened. Yellow fever was stamped out and for many years the canal zone has been exempt from the scourge which was so merciless in the years of the French occupation.

The sea level idea appealed so strongly to the American people that a popular demand for it seemed imminent. While the President embraced the hope that a sea level canal was practicable, he decided that a change of plan should not be accepted until he had secured for himself and the Congress of the United States the wisest advice along engineering lines that was procurable. He decided to bring about the appointment of an international commission to make a study of the merits of both types of canal, and to that end he requested certain foreign powers to appoint eminent engineers to serve with the Americans whom he would select. King Edward appointed Mr. William Henry Hunter, Mem. Inst. C. E., Chief Engineer Manchester Ship Canal; Emperor William of Germany appointed Mr. Eugen Tincauzer, Koniglich Preussischer Regierungs- und Baurat, Mitglied der Regierung zu Konigsberg i. Pr., Germany; President Loubet of France appointed Adolphe Guerard, Inspecteur-General des Ponts et Chaussees, France; and E. Quellennec, Ingenieur en Chef des Ponts et Chaussees; Ingenieur Conseil de la Cie. du Canal de Suez, France; Queen Wilhelmina appointed J. W. Welker, Hoofdingenieur-Directeur van den Ryks-Waterstaat, the Netherlands. The American engineers appointed by the president to serve with these distinguished foreigners were: George W. Davis, Major General, U. S. Army, Retired, Chairman; Alfred Noble, Chief Engineer, East River Division P., N. Y. & L. I. R. R.; Mr. William Barclay Parsons, Chief Engineer, New York Subway; Mr. William H. Burr, Consulting Engineer, Board of Water Supply, New York City, Professor of Civil Engineering Columbia University, Engineering Expert, Aqueduct Commissioners, New York City; Henry L. Abbot, Brigadier General, U. S. Army, Retired; Mr. Frederic P. Stearns, Chief Engineer, Metropolitan Water and Sewage Board, Boston; Mr. Joseph Ripley, General Superintendent St. Marys Falls Canal; Mr. Isham Randolph, Chief Engineer Sanitary District of Chicago. John C. Oakes, Captain Corps of Engineers, General Staff, U. S. Army was appointed Secretary of the Board of Consulting Engineers for the Panama Canal.

This Board convened in the City of Washington on the first day of September, 1905. A letter from Chairman T. P. Shonts of the Isthmian Canal Commission advised us of the data placed at our disposal and of the arrangements made for our study and investigations. All of the maps, reports of investigations made on the Isthmus by both French and American engineers, and such collateral data as were deemed pertinent, had been assembled for our use. Our studies commenced at once and were pursued with assiduity. On September 11, 1905, on invitation of President Roosevelt, the Board made the pilgrimage to "Sagamore Hill," the President's home and summer capital at Oyster Bay. Our reception was cordial and we were first entertained by a substantial luncheon presided over by our host and enlivened by a flow of conversation and anecdote that was most agreeable. After luncheon we were assembled in a beautiful and spacious room (a recent addition to the home, added for reception purposes) and there addressed by the President.

His opening sentence was: "What I am about to say must be considered in the light of suggestion merely, not as direction. I have named you because in my judgment you are especially fitted to serve as advisors in planning the greatest en-

gineering work the world has yet seen; I expect you to advise me, not what you think I want to hear but what you think I ought to hear." This was followed by a strong plea for a sea-level canal. Many good reasons were advanced in support of that type of canal. (For this address, see page 12 of the report of the Board). We returned to Washington and resumed our studies. On September 27th, we visited the Wauchussetts dam and other important works constructed by the Metropolitan Water and Sewage Board of Boston.

On September 28th, we sailed from New York for Panama on board the S. S. "Havana," accompanied by Mr. T. P. Shonts, General O. H. Ernst, Rear Admiral Endicott and Mr. B. M. Harrod of the Commission. The tenth meeting of the Board was held on board at ten A. M. September 30th. All were present except Mr. Noble, who remained in New York: his familiarity with the Isthmus, gained during his connection with his studies of the Isthmian Canal Commission, 1899-1901, made further examination by him unnecessary. We landed at Colon on the morning of Wednesday, October 4th, and for the next week devoted our time to a study of the physical features of the chosen route and to obtaining the ideas of those engineers on the work whose experience and observation served to give value to their views upon the many questions on which we had to pass. We gave the Chief Engineer, Mr. John F. Stevens, a very exhaustive examination. At its close I asked if he had any suggestion, any plan of his own, that he would like to have embodied in our report. His reply was: "I suppose I am the only man in the United States who has not a plan for this canal. You gentlemen tell me what is to be done and I will do it." He is a man who does things and he did them in Panama.

Those few days spent in close contact with the actual conditions to be met with in doing the work and in study of materials to be encountered in its execution served to convince some of us that the sea level canal project ought not to be adopted. On the third day out from New York on our way down, the Chairman laid before the Board a letter he had received from Mr. C. D. Ward, enclosing a copy of his paper on the "Gatun Dam" which was read before the American Society of Civil Engineers, of which Mr. Ward was a member, on May 18th, 1904. The arguments in that paper appealed so strongly to Mr. F. P. Stearns of our Board that he became a strenuous advocate of its recommendations and, today, the Gatun Dam stands in evidence of the fact that some of man's most prodigious creations have been evolved from the "baseless fabric of a dream." No single feature of the project, as now constructed, was subjected to more persistent and hostile criticism than this earth dam which has now taken its place among the "everlasting hills."

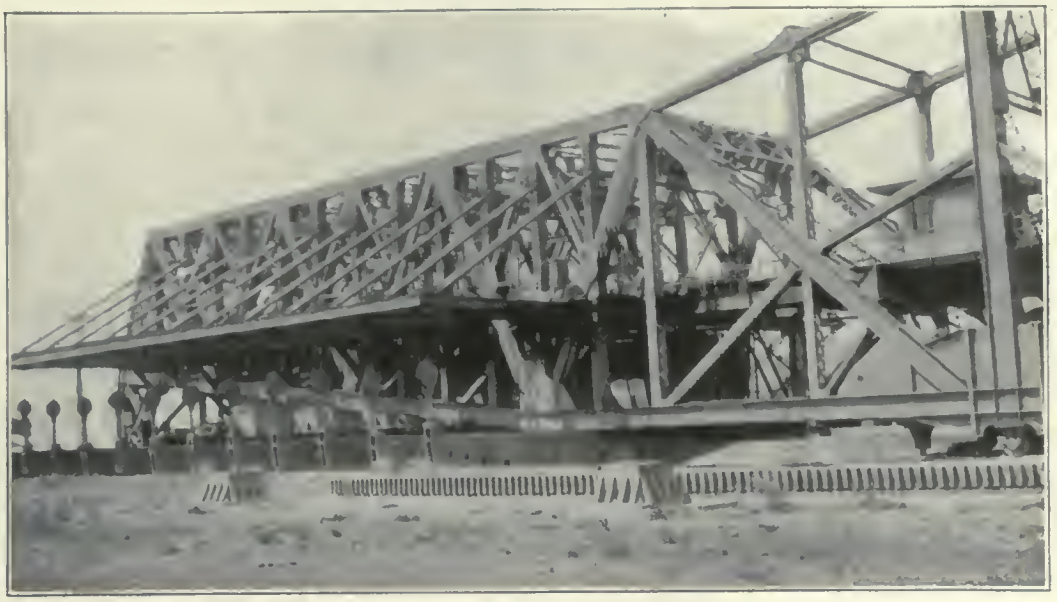
Our time in Panama was almost wholly consumed by the studies for which we had come and the only relaxation enjoyed was at a breakfast given to the Board by Governor Magoon and a formal call upon the President of the Republic, Dr. Amador. We were received at the Government building with distinguished consideration and our entrance was between files of soldiers in dress uniforms and officers clad in "all the pomp and circumstance of war," who saluted us and led the way to the reception room, where we met the President and his Cabinet. The President was a man of quiet and dignified manners and the brief interview left a pleasant impression.

We sailed from Colon for New York on October 11th, on the ship on which we had come. With the crystalizing of our ideas and the strengthening of our convictions came vigorous discussions of the merits of the two types of canal. The five foreign members were a unit for a sea level canal. With them stood General George W. Davis, Chairman, Mr. William H. Burr and Mr. William Barclay Parsons.

Their contention and our counter arguments may be condensed into a brief statement, boiled down from very lengthy discussions indulged in by the advocates of each type of canal. For the sea level, the claim was made that the time of passage through the sea level channel would consume less time than passage through a lock canal. This, we admitted, would be true until the number of vessels reached fifteen per day at which time—as we demonstrated to our own satisfaction—the time would be equal for each type. In a channel of the dimensions which was proposed, no two large vessels would be allowed to pass with both in motion; one must tie up. This meant a loss of time equivalent to that lost in lockage. In the lock canal, moreover, for eighty-two per cent of the distance there would be deep, wide water in which the vessels could move at sea speed, while in the narrow sea level channel the speed must be reduced to six miles per hour or less. Illustrating this discussion, see the following table taken from the report:

Type of ship	Distance between passing places	Type of Canal	Time required for transit across the isthmus				
			10 ships per day	15 ships per day	20 ships per day	25 ships per day	30 ships per day
	Miles		Hours	Hours	Hours	Hours	Hours
Type C, 540 ft. by 60 ft. by 32 ft.	5.0	Sea level.	8.9	9.6	10.5	11.5	12.9
	2.5	....do....	8.6	9.0	9.7	10.3	11.1
		Lock.....	9.5	9.6	9.7	9.8	10.0
Type E, 700 ft. by 75 ft. by 37 ft.	5.0	Sea level.	11.6	12.8	14.3	16.2	18.9
	2.5	....do....	11.1	11.6	12.6	13.6	14.7
		Lock.....	10.5	10.7	10.8	10.9	11.1

The capacity for traffic of the two types was discussed. We met the claim for greater capacity in the sea level by citing the fact that in the previous year, the Saulte Ste. Marie lock canal had passed 36,617,699 tons in eight months as against 11,500,000 tons through the Suez canal in the twelve months of 1904. Then the question of the vulnerability of the two types was discussed. The sea level advocates claiming that in time of war the locks could easily be destroyed by hostile agents. We contended that forces could be concentrated for the defense of the locks whereas in a jungle country, such as this canal would traverse, vessels would be at the mercy of guerrillas who could sink them easily. During this discus-



ONE OF THE EMERGENCY DAMS. NOTE MOVABLE PARTS UNDER THE BRIDGE STRUCTURE.

sion, Mr. Quellennec received a telegram advising him that the British barque "Chatham" was sunken in the Suez canal, blocking traffic. On November 7th, the following cablegram was received and translated for us by Mr. Quellennec:

"Paris, November 4th, 1905.
Board of Consulting Engineers, Panama Canal, Washington:
Interruption to traffic occasioned by Chatham exactly ten days. Number of vessels having waited twenty-four hours or over to enter, 53 at Port Said and 56 at Suez. Number of vessels that entered canal within twenty-four hours after traffic had been established, 51. Maximum number of vessels that entered canal during twenty-four hours under normal conditions since opening of canal, 36.
(Signed) BONNET."

So we had in this incident a demonstration, in time of peace, of what could much more easily happen in time of war.

Of course, all of the changes were rung on the danger to ships and locks both, in that type of canals and our condensed answer is found on page 91 of the report:

"This canal (St. Mary's Falls) has been in operation a little more than fifty years and a traffic aggregating about 360,000,000 tons, net register, has passed through it with no accidents seriously obstructing navigation."

The locks, as actually built, are equipped with safe-guarding devices more elaborate and more perfect than were conceived of at the time of these discussions. Of course, the elements of cost and time involved in construction figured largely in the discussion. The majority report gives its estimated cost as $247,021,200.00, and the time required to complete as twelve to thirteen years. The minority report placed the cost of the lock project at $139,705,200.00, and the time required to build as nine years. This latter estimate of time has been justified by actual performance but the estimate of cost has been totally eclipsed.

Over the relations of the Chagres river to the problem, the differences of opinion between the proponents of the two types of canal were most radical. The minority could not accept the plans and estimates of the majority for the diversion and control of that river as being adequate. The Chagres river was, and ever would have been, an enemy, a perpetual menace, to the sea level canal; whereas it is the friend and ally of the lock canal, supplying the water which alone made the present construction possible.

The issues between the advocates of the two

SECOND LOCK LEVEL AT GATUN. CANAL AND OCEAN IN THE DISTANCE.

types of canal having now been presented, a brief description of what was advocated is in order.

Tabular Comparison

Bottom width of channel	Lock Canal with summit level at elevation 85		Sea Level Canal	
	Length Miles	Percent of route	Length Miles	Percent of route
1,000 feet	19.08	38.4	0.00	0.00
800 "	3.86	7.8	0.00	0.00
500 "	12.29	24.7	4.87	9.90
350 "	0.00	0.00	.77	1.60
300 "	7.21	14.50	3.05	6.20
200 "	4.70	9.4	19.47	39.60
150 "	0.00	0.00	20.39	41.50
Locks & approaches	2.58	5.20	0.59	1.20
Total	49.72	100.00	49.14	100.00
Excavation, cubic yards	95,955,000		231,026,477	
Estimated cost	$139,705,200.00		$247,021,200.00	
Estimated time required to build	9 years		12 to 13 years	

Owing to the fact that the range in tide in Limon Bay is about two feet between extreme high and low stages and that the extreme range in the bay of Panama is twenty-two feet, it was conceded that a tidal lock at the Pacific end of the canal would be a necessity and the majority provided for such a lock in their plans and estimates, thereby admitting that an absolute sea level canal was not a possible creation on the route chosen.

The minority departed from the project of the Isthmian Canal Commission of 1899-1901 in everything but the elevation of the summit level water-surface, which was established at elevation 85 ft. The Gamboa dam site was abandoned and the Gatun site adopted. The computed area of the Lake of Gamboa was thirty-eight square miles while the area of Gatun lake is 164 square miles. The locks at Gatun are in three flights, dividing the 85 feet of total lift into three lifts of 28.33 feet each. The lock dimensions recommended were: usable width 95 feet, usable length 900 feet, depth over miter sills, 40 feet. The first lock south of the Culebra Cut was located at Pedro Miguel with a descent of thirty-one feet—in a single lift—to Lake Sosa, the water surface of which was fixed at elevation 55 ft. above mid-tide. Lake Sosa was to have been created by building dams across the Rio Grande at LaBoca, joining Sosa hill on the east to San Juan hill on the west side of the river. Then Sosa hill was to be joined to Ancon hill by a dam, and a third dam was to be extended from Ancon hill in the direction of Corozal to high ground on the east side of the Panama railroad. The site selected for the Pacific locks was the west side of Sosa hill, two lifts of thirty-one feet each. All locks were to be in duplicate.

In regard to Lake Sosa and the Pacific terminal locks, the Minority report says: (see pages 78-79)

"If for military or other reasons, the location of the teminal locks on the Pacific at the shore line of Sosa should be deemed inadvisable and the location at Miraflores, three and six-tenth miles inland, be substituted, the cost of the canal would be increased about $8,000,000.00."

Mention has already been made of Mr. C. D. Ward's communication to the Board recommending the construction of a dam at Gatun. A reprint of Mr. Ward's paper, presented to the American Society of Civil Engineers is given as Appendix I, page 279 of the report. In that paper he speaks of the Gatun dam site having been suggested by Ashbel Welch in 1880. Major Cassius E. Gillette, Corps of Engineers, U. S. A. also brought to the attention of the Board a paper of his which was printed in the Engineering News, July 27th, 1905, entitled "The Panama Canal, some serious objections to the sea level plan." The most elaborate plans and proposals brought before the Board, and urged with much insistance, were those presented respectively by Mr. Lindon W. Bates and Mr. Philippe Bunau-Varilla. The latter project was for the "Straits of Panama." The Board gave patient attention to the elaboration of their projects by these two gentlemen with the result that the records of its twenty-fifth meeting contains this entry:

"Resolved, That after careful consideration, it is the sense of the Board that the adoption of the plan of either Mr. Bunau-Varilla or Mr. Bates is not expedient."

The Board completed its labors and the majority report favoring the sea level canal was signed by

George W. Davis
William Barclay Parsons
William H. Burr
William Henry Hunter
Ad. Guerard
Eugen Tincauzer
J. W. Welcker
E. Quellennec

Of these signators, Messrs. Hunter, Tincauzer, Welcker and Quellennec were men who had had previous experience in canal construction and operation.

The minority report recommending the lock canal was signed by

Alfred Noble
Henry L. Abbott
Frederic P. Stearns
Joseph Ripley
Isham Randolph

Noble had built the Poe locks at Sault Ste Marie and had an intimate knowledge of canal requirements. Ripley was Noble's assistant and later, as superintendent of the St. Mary's Canal, had the lock under his charge; Randolph had built the Chicago Sanitary & Ship Canal, at that date the largest (not the longest) artificial waterway man had ever built.

The report of the majority is dated January 10th, 1906. The report of the minority is without date. The Board held its final meeting January 31st, 1906, in the office of Mr. Parsons, 60 Wall Street, New York. Present: The chairman, Messrs. Noble, Burr, Parsons, Abbot, Stearns, Ripley and Randolph. The foreign members had returned to their homes. Both reports were delivered to the Isthmian Canal Commission. That Commission in turn transmitted them to the Secretary of War under date of February 6th, 1906, accompanied by a communication which ends with this statement:

"It is our opinion that the plan proposed by the minority of the Board of Consulting Engineers is a most satisfactory solution of the problem of an Isthmian Canal, and therefore, we recommend that the plan of the minority be adopted, subject, of course, to such changes as may be found desirable during construction and with the understanding that the works in Limon Bay be deferred for the present. The entrance now in use at that place must for the present be used in any event, in order to secure harbor room for the landing of supplies immediately needed. The question of whether or not it should be changed and what changes should be made can better be determined hereafter."

(Signed) T. P. Shonts, Chairman.
Charles E. Magoon,
Peter C. Hains, Brig.-Gen. U. S. Army (Retired).
O. H. Ernst, Col. Corps Eng.
B. M. Harrod.

A minority report favoring the sea level was submitted which ends with these words:

"Believing that a sea level canal substantially according to the project of the Consulting Board would best serve the present and future commerce of the world and the military necessities of this nation, I have the honor to recommend its adoption."

(Signed) Mordecai T. Endicott.

Mr. John F. Stevens submitted a letter ending thus:

"I therefore recommend the adoption of the plan for an 85-foot summit-level lock canal as set forth in the minority report of the Consulting Board of Engineers."

The Secretary of War forwarded both reports and those of the Isthmian Canal Commission, and the letter of the Chief Engineer, to the President with a communication which concludes:

"We may well concede that if we could have a sea level canal with a prism from 300 to 400 feet wide, with curves that must now exist reduced, it would be preferable to the plan of the minority, but the time and cost of constructing such a canal are in effect prohibitory.

"I ought not to close without inviting attention to the satisfactory character of the discussion of the two types of canal by the greatest canal engineers of the world, which insures to you an to Congress an opportunity to consider all of the arguments, pro and con, reaching a proper conclusion."

(Signed) William H. Taft,
Secretary of War.

Then comes the transmission by the President to the Congress of the reports accompanied by a message which ends with these words:

"The law now upon our statute books seems to contemplate a lock canal. In my judgment, a lock canal, as herein recommended, is advisable. If the Congress directs that a sea level canal be constructed, its direction will, of course, be carried out. Otherwise, the canal will be built on substantially the plan for a lock canal outlined in the accompanying papers, such changes being made, of course, as may be found actually necessary, including possibly the change recommended by the Secretary of War as to the site of the dam on the Pacific side."

(Signed) Theodore Roosevelt.

The White House, February 19th, 1906.

Congress acted favorably upon the President's recommendation and the task undertaken by the minority of the Board of Consulting Engineers for the Panama Canal was accomplished. The majority of the Isthmian Canal Commission, the Secretary of War, the President of the United States, and Congress, were converted to the true faith of the lock canal and the tide of public opinion which had set so strongly toward the sea level project reached its flood and receded.

The construction work, wisely and efficiently organized, was being pushed with all the vigor that a born leader of men could inspire. The sanitary measures enforced by Col. Gorgas had banished the scourge of yellow fever and the fear of it. The work was carried on by forces directly employed by the Government, but building the canal under contract was considered advisable and was urged by Mr. Stevens, the Chief Engineer. The method under which bids were invited provided that the Government should supply the equipment and the contractor to supply the labor and supervision thereof and to be compensated on a basis of percentage of cost. On January 13th, 1907, the following bids were received:

George Peirce & Co.	7.19 per cent
William J. Oliver and Anson M. Bangs.	6.75 per cent
McArthur-Gillespie Co.	12.50 per cent
North American Dredging Co.	28.00 per cent

On February 26, 1907, the Isthmian Canal Commission, under orders from the President, rejected all bids. The President gave his reasons for this in considerable detail. In this letter, he says: "Less than two days ago I received a letter from Mr. Stevens in which he asks to be entirely relieved from work on the canal as soon as he could be replaced by a competent person and that person could become familiar with the work. I have accepted his resignation."

What were the reasons prompting this resignation? Two strong wills clashed and one of these strong wills had back of it the executive power which resides in the head of a great nation.

The Fourth Isthmian Canal Commission was appointed March 7th, 1907 and entered upon the discharge of its duties the ensuing first of April. Its membership embraced Lieut. Col. George W. Goethals, Chairman and Chief Engineer; Major David DuB. Gaillard; Major William L. Sibert; Civil Engineer H. H. Rouseau, U. S. N.; Col. W. C. Gorgas; J. C. S. Blackburn and Jackson Smith. Joseph Bucklin Bishop was made Secretary of the Commission. On July 14th, 1908, Col. F. H. Hodges succeeded Mr. Jackson Smith. Col. Hodges' designation was Assistant Chief Engineer. Avoiding details, it is sufficient to state that the work was segregated into three divisions: First, the Atlantic Division, extending from deep water in Limon Bay to and including the Gatun Locks and Dam, 7.7 miles, Major Wm. L. Sibert in charge; Second, the Central Division, Major D. DuB. Gaillard in charge; including the Culebra Cut, extending from Gatun to Pedro Migul, 31.7 miles; Third, the Pacific Division, including the Pedro Miguel and Miraflores locks and extending to deep water in the Pacific, 11 miles, in charge of Mr. S. B. Williamson, C. E. The efficiency of this organization is evidenced by the work accomplished; in 1907, the excavation was 15,765,290 cubic yards; in 1908, the volume taken out, 37,116,735 cubic yards and that was the maximum year's work. All previous records of accomplishment were broken and higher standards of efficiency established. In 1908, the plans for the canal underwent radical changes which enormously increased the volumes of material to be excavated and largely increased the volume of material involved in lock construction. On October 23rd, 1908, President Roosevelt addressed a memorandum to the Secretary of War authorizing him to have the bottom width of the Culebra cut increased from 200 feet to 300 feet. The report of the Chief Engineer for 1907, page five, says: "The locks are in pairs as now proposed with usable lengths of one thousand feet and widths of one hundred feet." From page seven of the annual report for 1908, I quote:

"The locks are in pairs and since the compilation of the last annual report the projected dimension have been increased so that the width in the clear will be 110 feet, the usable length remaining as heretofore, 1,000 feet. The question of increasing the width was raised by the General Board of the Navy in a memorandum to the Secretary of the Navy dated October 29th, 1907, setting forth that the width of the locks as now fixed, namely 100 feet, is insufficient for probable ships of future construction and that sound policy would dictate an increase to a clear width of 110 feet."

While the Commission, after due consideration was of the opinion that the width already adopted for locks—100 feet in the clear—was ample for

all commercial vessels, and sufficient for any battleship constructed, building or projected, it felt that the wishes of the Navy, as expressed by the General Board, should be followed, there being no insuperable obstacles, and it accordingly recommended that the project be modified as desired. This modification was approved by the President, under date of January 15th, 1908.

While the lock canal had back of it the approval of the Chief Executive and the sanction of Congress, the agitation for a sea level canal was still kept up by some of the newspapers and by one of the leading technical papers. The prodigious accomplishments in the way of excavation shown by the reports from the zone served the proponents of the sea level canal as an argument in its behalf. This agitation became so serious that President Roosevelt decided to meet it fairly and, with that end in view, he arranged with the President-elect to visit the Isthmus and take with him an advisory Board of Engineers. Those whom he appointed were: James R. Freeman, James D. Schuyler, Frederic P. Stearns, Capt. Henry Allen, Allen Hazen, A. P. Davis and Isham Randolph. The armored cruiser "North Carolina" — Capt Marshall — and her consort, the "Montana"—Captain Reynolds— were detailed to take Mr. Taft and his Advisory Board to Panama. Mr. and Mrs. Taft and our Board took passage on the "North Carolina" and the "Montana" acted as escort. The start was made from Charleston, S. C. on the morning of January 25th, 1909. En route for Charleston, I stopped over in Washington for a few hours and paid my respects to the President. He then said to me: "I do not think you will find anything on the Isthmus to change your mind about the type of canal, but if you do, I believe you will have the moral courage to say so; and you may be assured that both Mr. Taft and myself have the moral courage to make any change that is justified by the facts."

We arrived in the harbor of Colon, January 29th, and were met by Colonels Goethals, Gorgas and Hodges, and Majors Sibert and Gaillard and Secretary Bishop. We proceeded to Gatun and there effected a permanent organization by electing Mr. Frederick P. Stearns chairman and Mr. Allen Hazen secretary. We were on the Isthmus eleven days and made most critical and careful examination of every phase of the subject that was the cause of our being sent on this mission. The result was that we were each and every one convinced that no mistake had been made when the lock type of canal was adopted.

One incident occurring during out sojourn is of special interest; namely, the opportunity to get an idea of what the harbor of Colon needed in the way of breakwater protection. When the International Board of Engineers was on the Isthmus, Limon Bay was as smooth as a mirror, but on February 1st a Norther set in and on the next day Mr. Taft and his advisors saw a condition which carried conviction that breakwaters ought to be provided to make the harbor safe. All of the vessels that were in port when the storm broke had to put to sea for safety.

Another item of interest for entirely different reasons was "un baile" given in honor of Mr. Taft (Presidente electo de los Estados Unidos de Norte America) and Mrs. Taft, by "El Presidente de la Republica y la Senora Obaldia." This function took place in the "Teatro Nacional" on the evening of February 5th. From my diary, I quote:

"Presidente and Mrs. Obaldia stood with Mr. and Mrs. Taft and endured a siege of hand-shaking. After the hand-shaking, all of the high dignitaries went over to the stage area and, to slow music, danced a very stately measure with which none of them seemed very familiar. Then dancing became general."

The National Theatre is one of the items in which the $10,000,000.00 paid to Panama was invested. It is a very beautiful building and one well suited to such a function as the one of that evening. The feast was lavish and champagne was in flood like the Chagres.

The return voyage commenced in the late afternoon of February 7th. The home port was New Orleans. At Port Eads our party was transferred from the "North Carolina" to the scout steamer "Birmingham." We reached New Orleans on the afternoon of February 11th and, leaving Mr. and Mrs. Taft to enjoy the ovation tendered by the City of New Orleans, we hastened to Washington and on Tuesday, February 16th. we submitted our report to President Roosevelt. He read it over and promptly, in our presence, dictated a message of transmittal to Congress. The reports and message put a quietus on the hopes of sea level advocates.

We now come to a comparison of the estimated cost of a lock canal submitted by the Minority of the "Board of Consulting Engineers" with the actual cost thereof as shown by the report of the Isthmian Canal Commission for 1913, (see page 427 to 429.)

Comparable Items.	Estimates of Minority of Board of Consulting Engineers.	Report of 1913.
Construction account	$134,965,200.00	$185,316,095.75
Panama R. R. reconstruction	4,440,000.00	8,656,061.20
Land damages	300,000.00	617,262.15
	$139,705,200.00	$194,589,419.10
Excess cost over estimate of of comparable items	54,884,219.10	
	$194,589,419.10	

Cost of items not covered in the Minority Report:

Payment to New Panama Canal Co.	$ 40,000,000.00
Payment to Republic of Panama	10,000,000.00
Civil administration	6,393,308.73
Department of Law	44,982.27
Department of Sanitation	16,250,164.93
Hotels & Buildings	10,233,182.16
Water & Sewers	6,878,583.68
Roads & Paving	2,726,932.32
Operation & Equipment of Panama Railroad	5,581,388.79
Purchase, Improvement & Repair of Steamers	2,680,112.01
Docks & Wharves	490,548.16
Moving and Care of French Equipment	2,833.23
Fortifications	3,114,357.52
Total items not reported on by the Board of Consulting Engineers	$104,396,393.80
Total amount expended	$298,985,812.90
Total Bond issue authorized by Congress	375,200,900.00
Balance of issue available for work in Panama	76,215,087.10

These are enormous figures and the expenditures have been so made as to leave no shadow of reproach upon the administrators of the fund. No peasant class in any land laments the loss of the hoarded earnings of their lives of toil, as did

the peasantry of France after work was suspended in 1889. No pround names have been humiliated; and the strong hand of the law need not to be invoked to punish dishonesty on the part of any administrative officer.

The figures show that the actual cost of the work accomplished to June 30th, 1913, exceeded the estimates presented by the minority of the Board of Consulting Engineers by $54,884,219.10. How is this discrepancy to be accounted for? Largely by the increased amount of excavation. The total yardage to June 30th, as shown by the reports, was 203,383,539 cubic yards. The total yardage estimated by the minority was 104,745,-000 cubic yards, of this amount 95,955,000 was channel prism excavation. A part of this increased yardage was due to widening the Culebra Cut from 200 to 300 feet. This increase is stated to have been 13,000,000 cubic yards, which amount added to the 53,765,000 computed for the 200 foot width, gives a total of 66,765,000 cubic yards; but the excavation reported to June 30th, 1913, was 93,305,974, showing that the volume of slides to that date had been 26,540,975 cubic yards. The abandonment of the location of the locks and dams recommended by the minority for the Pacific end of the canal added nearly $8,000,-000.00 to the cost, and the increased length and width and modern equipment of the locks added about $9,700,000.00.

In his report of 1909, Colonel Goethals gives

A SLIDE IN THE CULEBRA CUT.

quite an elaborate analysis of these differences and he ends that analysis with this statement:

"This estimate shows that nearly 50% more work is necessary to complete the canal than was contemplated by the original estimate and that the unit prices, due to labor conditions, cost of materials, and gratuities given the employes have been increased about twenty per cent."

But the end is not yet. The final reckoning with Culebra will only come when the last avalanche of mud, and stone engulfed in it, has been dredged away and what is left of Gold Hill and Contractor's Hill has reached the angle of repose. The report of the Board of Consulting Engineers contains 426 pages; of these pages fourteen are devoted to the geology of the Canal Zone, prepared by Mr. Marcel Bertrand, Professor in the National High School of Mines, Paris, in collaboration with Mr. Philippe Zurcher, Chief Engineer of Bridges and Routes of Communications, of France. This interesting item is taken from page 163, referring particularly to the Culebra Cut.

"The examination of these lands shows that they will stand extremely well, and this fact has been practically proved by the experience of the preparatory trench (cunette), the slopes of which have been exposed to the air for more than two years. Even the marl, which, when in separate pieces, disintegrates and splits easily, resists very well in a mass, and may require, at the most, some local supports to protect it from the action of the atmosphere."

The Isthmian Commission of 1899-1901 proposed to wall this cut and carry the railroad through it on a terrace formed by the wall on the east side. Events have shown that no wall that could have been built would have stood up against the slides.

CLEARING THE SLIDE.

In his report for 1913, page 23, Col. Goethals says:

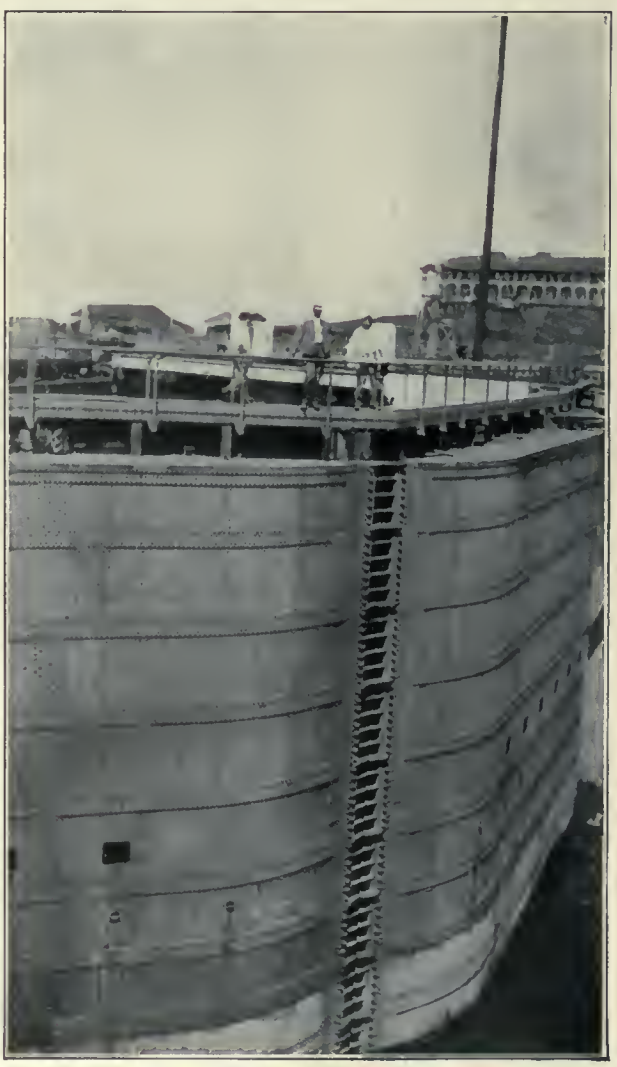
"The predictions of the geologist in the last annual report with reference to the Cucaracha slide, that *'The end of activity of this slide is now well in sight, however, because all loose surface stones and clay have almost slid off, exposing several large dikes and flows of basalt which would successfully maintain in place most of the remaining material'* has not been realized."

While there was much to condemn in the business conduct of the French projectors of the Panama Canal, their engineers are deserving of high praise. It is my conviction that, if these engineers had been given the money that was raised ostensibly to build the canal, they would have accomplished that which they undertook, and the commerce of the world would have paid its tolls to the French Company and not to the American Government. These French engineers had to combat the physical problems that nature put up to them. They were handicapped by the rapacity of their own countrymen and they had to meet the "yellow death," against which the medical science of the day had found no defense. The triumphs of medical science made the canal possible and W. C. Gorgas was the great apostle of that science who carried its salvation to Panama.

One thinks of the army of workers moving forward under the leadership of skilled and determined men to the final accomplishment of a great work and mayhap forgets that it demanded ability of a high order to keep this army properly victualled and clothed; conditions so essential to the efficiency of the workers. How admirable these conditions have been under the Quartermaster's department as directed by Lieutenant Colonel C. A. Devol, U. S. A., and by Major Eugene T. Wilson, U. S. A., of the subsistence department, is a part of the proud history of America in Panama.

All American engineers glory, with the American people, in the achievements in Panama of the men of the Corps of Engineers of the United States Army. In many fields, that Corps has built up and sustained a reputation for ability, honor, and integrity, which is a glory to the service; but we civilian engineers would not have our countrymen forget the part that our unbrevetted fellows bore in the building of the Panama Canal. Goethals, Hodges, Sibert, Gaillard will always be foremost in the thought when the building of the great canal is under discussion; but I do not believe that they forget, or for one moment underrate, the support they had from Williamson, Goldmark, Schildhauer, Zinn, Saville, Nichols, Cornish and others, who supplemented their efforts from start to finish. The work stands as a triumph of American accomplishment; builded into it are American imagination, American creative genius, American brains, courage, perseverance and a tithe of the vast resources of our people; a work not for ourselves alone but for all the peoples of all the climes "who go down to the sea in ships and do business in great waters."

LOCK GATE IN COURSE OF CONSTRUCTION.



DETAIL OF FINISHED LOCK GATE.

THE USE AND BENEFITS OF THE PANAMA CANAL

By Emory R. Johnson, Ph. D., Sc. D.

Professor of Transportation and Commerce, University of Pennsylvania; Member of Public Service Commission of Pennsylvania; Special Commissioner on Panama Canal Traffic and Tolls, 1911-13.

The Panama Canal has been constructed to shorten the length and time of ocean voyages in order thereby to reduce the costs and rates of transportation, to increase the volume of possible shipments, and to enable industry to develop with the expansion of trade. The opening of the canal to the world's shipping makes this an opportune time to inquire what economies the waterway will effect, what use will be made of the new route via the Isthmus and how American commerce and industry will be developed.

The people of the United States are interested, first of all, in the shortening of distances by ocean routes between the two seaboards of the country and in the reduction of freight rates between Atlantic and Pacific ports. Up to the opening of the canal, heavy traffic between the east and west coasts of the United States continued to move via the Straits of Magellan, although from 1907 until stopped by the revolution in Mexico, package freight and some bulky articles were shipped by way of the Isthmus of Tehuantepec. The large fleet which the American-Hawaiian Steamship Company employed in the service via Tehuantepec and the vessels that were operated between the two seaboards of the United States through the Straits of Magellan (as well as numerous ships not previously in the intercoastal service) are now using the Panama route.

The distance between New York and San Francisco via the Straits of Magellan is 13,135 nautical miles as compared with 5,262 miles by way of the Panama Canal, the saving being 7,873 sea miles. The time saved in making the run from New York to San Francisco via Panama instead of by way of the Straits of Magellan is 32.3 days for a 10-knot freight steamer, and 26.8 days for a vessel of 12 knots speed. A passenger vessel of 16 knots average speed (which would, of course, not be operated via the Straits of Magellan) can make the voyage from New York to San Francisco in two weeks, or in fifteen days, if a day be spent at Panama to enable passengers to see the canal and the sights of the City of Panama.

The western section of the United States is hardly less interested in a shorter route to Europe than in a reduction in the distance by water to the eastern part of the United States. West coast products are exported largely to Europe and the transportation costs by way of the Straits of Magellan have been heavy. The Western States, moreover, import large quantities of iron and steel, textiles and other manufactures and have much to gain by the more active competition which European manufacturers, shipping by way of the Panama Canal, will be able to maintain with producers in the eastern part of the United States for the trade of the Pacific seaboard and the section which gets its supplies in greater or less share from the west coast importers and jobbers. The distances via the Panama Canal to San Francisco are 5,666 miles less from Liverpool, and 5,528 less from Hamburg than by way of the Straits of Magellan, the reduction in time of voyage for 10- and 12-knot freight steamers being respectively 23 and 19 days.

The export trade of the west coast of South America is large in volume and of growing importance to the United States and to Europe. For a number of years, 2,500,000 tons of nitrate have been shipped annually from Chile, four-fifths of it being sent to Europe and one-fifth to the United States. There are large exports of Chilean grain and copper, and, after the opening of the canal, a heavy tonnage of high grade ore will be shipped from Chile to the United States and to Europe. At the present time, the west coast South American import and export trade accounts for some 4,000,000 tons of vessel entrances and clearances at the ports of Europe and the eastern seaboard of the United States. Europe has gotten six-sevenths of the west coast South American trade and the United States only one-seventh under conditions that have prevailed in the past. It is expected that the United States will, as the result of the opening of the canal, be able gradually to increase this percentage of the trade of western South America.

Practically all of the trade of the eastern part of the United States with that of western South America will be handled by way of the Panama Canal. The distance from New York to the principal nitrate port has been reduced 5,139 miles, and the time for 10-knot steamers has been shortened 21 days by the construction of the canal. Valparaiso has been brought 3,747 miles, and for 10-knot steamers 15 days, nearer New York by the opening of the canal. Europe naturally will be assisted less than the eastern part of the United States in trading with western South America, by the use of the Panama Canal; but Europe will be about 3,000 miles nearer the nitrate deposits and 1,500 miles nearer the grain fields of Chili in the future than she has been in the past. A 10-knot freight steamer will be able to make the run from Iquique to Liverpool and Hamburg in 11 days less time via the Panama Canal than by way of the Straits of Magellan. From Valparaiso to Liverpool the saving in time by the canal will be about 6 days.

In building the Panama Canal the people of the United States were concerned, first of all, with the reduction in the cost of transportation between the Atlantic and Pacific seaboards of the country. For several years prior to the opening of the canal, most of the freight shipped by water between the two seaboards of the United States was transferred across the Isthmuses of Tehuantepec and Panama, the larger share of the tonnage being shipped via Tehuantepec. The agreement which the American-Hawaiian Steamship Company made with the Mexican National Railway in 1907 provided that one-third of the through freight rate between the two sea-

boards should be paid to the railroad company for transferring freight from the vessel on one ocean across the Isthmus and into the hold of the vessel on the other ocean. It is reported that the Mexican National Railway received on the average, $3.50 per ton of 2,000 lbs. for its service. The cost of transferring freight from vessel to vessel across the Isthmus of Panama probably has been about $3.00 per cargo ton. This cost of $3 to $3.50 per ton of 2,000 lbs. for transferring freight across the Isthmus is equivalent to $6 or $7 per ton when calculated upon the net tonnage of the vessels employed in the trade, for the reason that modern freight steamers ordinarily carry two tons of cargo for each net vessel ton. The tolls fixed by President Taft in 1912 are $1.20 per net ton, or about one-fifth of the saving effected by the canal in the cost of transportation between the two seaboards of the United States.

The carrier is interested in the reduction in the cost of transportation; the shipper is concerned with the freight rates. That the canal will largely reduce the cost of transportation between the two seaboards of the United States and will reduce the cost of handling freight between the United States and the western coast of South America, Australia and the Orient north of Honkong, is certain. As regards the freight rates on traffic from the United States to foreign countries, it is probable that competition will give shippers most of the benefit of the reduction in the cost of transportation; but in all ocean services, particularly in the line traffic between the two seaboards of the United States, the extent to which the shippers, instead of the carriers, gain from the reduction in the cost of transportation depends upon the ability of the carriers, by agreements, to maintain rates above the level to which the charges would be forced by unrestricted competition.

In this connection the fact is to be borne in mind that most manufacturers and traders shipping goods between the two seaboards of the United States, via the canal, will be served by regular steamship lines; only a comparatively small number of exceptionally large producers will dispatch goods in full vessel cargoes in ships which they own or charter. With the exception of lumber, east-bound, coal, west-bound, and occasional large shipments of heavy steel products, most of the traffic will be handled in units of less than vessel loads; and the service desired by shippers will be that afforded by the regular lines, of which there will, in all probability, be several between New York and San Francisco, and one or more from each of the "out ports," such as Boston, Philadelphia and Baltimore.

In so far as traffic is handled in chartered vessels or in ships belonging to the owners of the goods transported, shippers may be expected to get the entire saving in the cost of transportation resulting from the use of the canal; but the rates of the regular steamship lines will be fixed by agreements of the rival carriers; and the history of steamship conferences shows clearly that competing steamship lines will be able, by means of their conference agreements, effectively to regulate their competitive services and charges. The services of the several lines will be distributed among the various ports. The rates between any two termini may be expected to be the same by all lines for similar services; and, in general, the rates fixed in the conference agreements may be expected to be maintained at such a level below the general schedule of transcontinental railroad charges as the managers of the steamship lines find by experience can be maintained, and yet secure the volume of traffic required to supply the vessels with the requisite traffic. Rates by water will not be all the traffic might bear, but will be what the shippers can and will pay for transportation by water instead of transportation by rail. Rates by water as well as by rail will be fixed with reference to what the traffic will bear.

If this be true—and it unquestionably is sound transportation economics—the people of the United States will be obliged, in order to secure the benefits of lower transportation charges to be obtained from the Panama Canal, to regulate the charges and services of the intercoastal carriers by applying to those carriers the general principles of regulation that have been successfully applied to rail carriers. The rules applicable to the regulation of carriers by water are not identical with the rules applicable to railroads, but the general principles to be followed are the same in both instances.

The most concrete measure of the commercial usefulness of the Panama Canal will be the volume or tonnage of shipping using the waterway each year. The probable traffic of the Panama Canal has been calculated with exceptional care. For six years, ending with 1898, the Panama Canal Company kept a record of vessel movements, from which the company was able to calculate the tonnage of ships that would have used a Panama Canal had one been in existence. Again, in the years 1899 to 1901, the Isthmian Canal Commission made an elaborate statistical investigation of the tonnage of available canal traffic. The tonnage figures arrived at by the French company and by the Isthmian Canal Commission showed that had an isthmian canal been in existence in 1899 the tonnage using the waterway would have amounted to 5,000,000 net (vessel) tons. This investigation by the Isthmian Canal Commission was made under the direction of the author who, eleven years later as special commissioner on Panama Canal traffic and tolls, made another equally careful statistical study of the tonnage of shipping that would have used the canal had one been in existence in 1910. During the eleven years intervening between the two investigations, the available traffic had increased from 5,000,000 to 8,328,000 tons. Inasmuch as it is doubtless safe to assume that the rate of increase that had prevailed from 1898 to 1910 will probably continue, it seems fairly certain that the tonnage of the Panama Canal during 1915 will amount to about 10,500,000 net tons. With an increase of only 60 per cent during the first decade, which is 12 per cent less than the rate of increase in the traffic of the Suez Canal during the decade ending in 1912, the tonnage of shipping using the Panama Canal in 1925, at the end of the first ten years of its operation, will amount to 17,000,000 net tons. Those to whom this seems to be a large tonnage may well compare it with the traffic of the Suez waterway, which, in 1912, was used by 5,373 ships having a net tonnage of 20,275,000. The traffic

of the Suez Canal in 1925 will doubtless exceed 30,000,000 net tons of shipping.

The tolls for the use of the Panama Canal—$1.20 per net ton with 40 per cent reduction for vessels in ballast—were decided upon after careful consideration had been given to the effect of the tolls upon the traffic and usefulness of the canal. It would have been undesirable to have imposed tolls high enough to have diverted from the canal to the Straits of Magellan any considerable portion of the large tonnage moving between Chile and the United States and Europe. It would also have been a mistake to have placed the tolls at a figure that would have lessened the use of the canal by the vessels operating between the eastern seaboard of the United States and Australia, and also the shipping engaged in the trade between the eastern seaboard of the United States and the Oriental ports from Manila and Hongkong northward. The saving effected by the canal for the traffic between the two seaboards of the United States and between the eastern seaboard of the United States and the west coast of South America, and between the western coast of North America and Europe, will be much greater than the tolls that have been established.

The payment made by vessels for the use of the canal, and consequently the revenues received by the United States Government from the canal, are determined by two factors—the rate of tolls and the tonnage upon which the charges are levied; accordingly, the Panama tonnage rules are of as much importance to shipowners as is the rate of tolls. The Panama tonnage rules prescribed by the President were formulated after a thorough study had been made of the merits and defects of the several national tonnage rules and of those in force at the Suez Canal. As prescribed, the Panama rules are more nearly like those of the Suez Canal Company than those by which the registered tonnage of American ships is determined. It is unfortunate that the American, British, French, German, Suez and other tonnage rules are not uniform. As a matter of fact, they differ in important details, those of the British Government, under the influence of British shipowners, having provided for an especially low net tonnage as compared with gross tonnage.

TOWING RUNWAY BETWEEN THE LOCKS AT GATUN.

UPPER SIDE OF GATUN SPILLWAY. CONE OF WATER IN DISTANCE.

The gross tonnage of a vessel, possibly it should be explained, is the measure of the entire closed-in capacity of the ship; the net tonnage is the entire closed-in capacity minus the spaces occupied by machinery, fuel, and housings for the crew. A vessel ton, gross or net, has nothing to do with weight, but is 100 cubic feet of space. A vessel of 5,000 tons, net, is a vessel of 500,000 cubic feet of capacity available for the storage of freight or for the accommodation of passengers.

The application of the Panama rules to the measurement of vessels will give vessels a somewhat smaller net tonnage than ships would have if measured by the Suez rules. The Panama net tonnage will be slightly in excess of the registered tonnage of American vessels, and considerably larger than the net tonnage of most vessels under the British or German flags. The Panama rules were drafted with a view to establishing for the Panama Canal as scientific a set of rules as could be formulated. It is to be hoped that the Panama rules will remain unchanged, and that they may have the effect ultimately of bringing about a greater degree of uniformity in the different tonnage rules now applied to the measurement of vessels.

The economies due to the use of the Panama Canal, especially for the traffic between north Atlantic countries and the countries of western South America, will result not only from the shortening of distance and time of ocean voyages, but also from reducing the fuel expenses of vessels engaged in the traffic. There is no coal in eastern South America, and that on the west coast is of poor quality. Vessels trading between Europe and the west coast of South America by way of the Straits of Magellan have to take on large quantities of fuel for the long run around to the west coast of South America, thereby reducing the space available for cargo and thus the earning ability of vessels. Coal will be relatively inexpensive at the Panama Canal, where it can be sold by the Government, without loss, at $5 per ton. The coaling stations at the canal will be largely used by merchant vessels, and in the traffic with western South America the fuel expenses will thereby be much reduced. Indeed, the reduction in fuel expenses will cause the Panama route to be taken by vessels from Europe to Santiago, Chile, even though the tolls charged at Panama somewhat exceed the saving which vessels can make by taking the Panama route instead of the one via the Straits of Magellan.

It is interesting to note that vessels trading between New York and Australia, or between New York and Manila, will find fuel expenses via Panama appreciably less than by way of the Suez Canal. Coal can profitably be sold by the United States Government at Cristobol for $1.25 less per ton than the price now charged at Port Said. The studies that have been made of fuel expenses via Panama indicate clearly that the lower fuel cost via the American isthmus will be of much assistance to the Panama route in competition with routes by way of the Straits of Magellan and the Suez Canal.

The studies that have been made of available canal traffic did not take into consideration the new traffic that will be able to move as the result of the opening of the canal. In the past, the rich beds of Chilean iron ore have remained unworked because the cost of transporting the ore to Europe and the United States was prohibitive. The prospective opening of the canal caused the Bethlehem Steel Company to construct a fleet of large ore carriers which have already begun to bring the ore from Chile to the United States. Some of the Chilean ore will also be taken to Europe. All of this traffic will pass through the Panama Canal. Prior to the opening of the canal, only a small quantity of the lumber from Washington and British Columbia could be marketed in the eastern part of the United States; with the reduced cost of transportation via the Isthmus, it is expected that a large trade in west coast lumber will be carried on by merchants who distribute lumber from Philadelphia, New York and other Atlantic ports. To some extent, this west coast lumber will supplant the lumber from the Southern States, but in larger measure the west coast lumber will supplement that from the South.

The Panama Canal will enable both the intercoastal and the foreign trade of the United States to be carried on under more favorable conditions than have prevailed in the past. It is too early to measure in detail the commercial effects of the Panama Canal; it is certain, however, that the influence of the canal will ultimately be far reaching. The American people, however, must not expect the canal to revolutionize the foreign trade of the United States. The canal will give the people of this country an opportunity to trade with western South America and with trans-Pacific countries under more favorable conditions as regards length of ocean routes and transportation costs, but economies in transportation will not alone determine whether the trade of Pacific countries will be mainly with Europe or with the United States. Europe has the lead of the United States in the commerce of Pacific countries. The exporters from Great Britain, Germany and other European countries are served by numerous steamship lines and by a vast tonnage of other available shipping. The financial and banking relations of Pacific countries are mainly with Europe. The merchants of Great Britain, Germany, Belgium and France have long established trade relations with the countries of the Pacific. European merchants have branch houses or agents in South American, Australian and Asiatic ports. It will take time to transfer the bankng, merchandising and trading relations of South American and trans-Pacific countries from Europe to the United States.

In order to secure the benefits obtainable from the opening of the Panama Canal, it will be necessary for the American bankers, manufacturers and traders to be alert; and it will also be necessary for the United States Government to formulate a broader commercial policy than has thus far prevailed. The Federal Government must seek by practical measures to develop a larger American merchant marine in the foreign trade, to facilitate by liberal legislation the growth of international trade, and by favorable banking laws to strengthen the financial position of the United States among commercial nations.

THE PANAMA CANAL AND THE RAILROADS.

By John Maurice Clark

Among the many questions raised by the opening of the Panama Canal, not the least interesting will be the effect of this great new waterway on the greater common carriers, the railways, to which it will appear in the two-fold guise of teammate and competitor. It will develop some new traffic in which the railways will have a share; it will take some of their present traffic away from them, and some traffic will be shifted from its present course, and will run in new channels. All this will bring gains to some carriers, possibly losses to others, while to most it will bring gain and loss commingled.

We expect an increase in our export trade to the west coast of South America and the Orient. Exports, moreover, must be paid for with imports. Now the greater part of the exports and imports must be carried by rail, some distance at least, and the profits on this business will be one of the benefits which the Panama Canal will bring to the railroads. For much of this commerce, New Orleans is the natural port, and, in proportion as New Orleans comes thus into its own, the railroads which serve that port must share in its prosperity. Not only in foreign trade does New Orleans expect great growth, but in trade to the Pacific Coast of the United States itself, diverting traffic from the overland routes. Thus the Illinois Central and the Louisville and Nashville may become competitors of the Union Pacific or even of the Great Northern. The strictly north and south lines are not, however, the only ones to share in this traffic. The Rock Island controls a route from Chicago to Galveston, and the 'Frisco system also includes a Gulf connection. Thus these western transcontinental roads, which are exposed to the most direct losses from the competition of the canal route, have at least some small chance to participate in gains as well.

So much for the commerce of the Gulf ports. What of the transcontinental traffic and carriers? These roads are clearly liable to very definite losses from the opening of a great new waterway which must inevitably strengthen the competition for business from coast to coast—a waterway through which their own ships may not pass.

Aside from the general, normal growth of business, there will undoubtedly be some business which the canal itself will create. Indeed, there will be a sort of rough, natural compensation at work by which, the more traffic is taken from the roads, the more of other sorts of traffic will come in to them. The steamers cannot make serious inroads into the railways' business without a very considerable lowering of rates; a slight reduction will not do it. And if rates are lowered a great deal, the result will be more than a mere diversion of the existing traffic; it will mean a stimulus to industry and commerce which cannot fail to furnish some work for the well nigh universal common carrier, the railroad.

But the growth of new business is problematical and takes time, and in the meanwhile the canal route will be taking away from the railroads some of the business they already have, just at the time when the revival of the long-and-short haul clause seems threatening to deprive them of their customary freedom in meeting the inroads of competition. At present the boat lines carry something over one-tenth of the transcontinental freight tonnage. However, the so-called "transcontinental" traffic includes shipments from as far west as the Mississippi River, and goods destined to inland points throughout the Pacific slope. In fact, only about one ton in five of the westbound transcontinental traffic comes from farther east than Buffalo and Pittsburg. The Middle West has become dominant over the Atlantic seaboard in the commerce of the Pacific slope.

Now, obviously, it is the traffic from seaport to seaport that is most exposed to water competition, and half of this traffic the boat lines have already taken from the railroads.

In one sense, it would seem as if the railroads had already suffered the greatest damage to which they stand exposed. And yet, even so, there has been no absolute shrinkage of traffic by rail. The increase in the water-borne tonnage has come out of the normal growth of the total volume of business. The question, to which the future holds the answer, is: will the added advantage from the use of the canal be enough to take from the railroads the balance of the coast-to-coast freight, and make serious inroads on the business moving from the interior cities?

Compared to the present rail-and-water routes across the isthmus at Panama and at Tehuantepec, the canal route will, of course, be faster and substantially cheaper. The steamship lines will save an amount which may be roughly estimated not to exceed 13c per 100 lbs. of freight, or something like one-tenth of an average transcontinental freight rate by rail.

This is on the supposition that the boats travel with full cargoes, but the indications are that they will probably find it quite difficult to secure an east bound tonnage equal to the westbound. It is only the heavy eastward movement of Hawaiian sugar that keeps the tonnage fairly well balanced at the present time. If the freight passing through the canal has to pay expenses on a balance of empty cargo space, the economy of the Panama route will not be quite as great as it appears on paper.

It must be further taken into account that the freight rate is not the only consideration in competition between a railroad and a line of steamboats. The rates are now from 20 per cent to 60 per cent lower by water, and still the railroads keep nearly half of the coast-to-coast tonnage. Obviously, a great deal of the business is governed by other considerations than the mere freight rate. It hardly seems probable that another 10 per cent subtracted would be enough to overcome all these "other considerations" at one blow, and take all the remaining traffic away

from the railroads, even if the roads did not meet the cut in rates.

One of the reasons why the railroads can charge more and still keep a large share of traffic is the fact that the train-isthmian route demands so much handling en route. If a short rail haul is needed at each end, the goods must be loaded and unloaded at least ten times, into and out of three freight cars and two steamers, and all of this means a greater risk of injury to the goods calling for more expensive packing to protect them. With the Canal in use, this disadvantage would be cut approximately in half, though it would still remain a substantial handicap. In the matter of speed the new route will about equal the ordinary slow-freight service of the railways.

There are some things which the steamers can not wholly divert by any reduction in rates. California fruit, and all goods using the special fast freight service of the railroads, would probably continue to move largely as it does now, no matter what inducements the steamship lines might offer. The fruit growers' co-operative associations have enormously increased the value of their crops by following up the shipments on their way eastward, and diverting them by telegraphic orders to the most favorable market. This advantage they will probably not abandon, even if the other obstacles to the carriage of fruit by steamer through the tropics should be successfully overcome. There is doubtless other traffic which will still prefer the overland route, for one special reason or another. On the whole, then, with regard to the strictly coast-to-coast traffic, the situation would seem to be this: that the railroads will not lose all of it in any case; but that they carry less than half of it at present, and would probably come out of a defensive rate war with a still smaller percentage.

Will they lower their rates? If this strictly through traffic were a thing by itself, they would probably make a determined effort to retain it. But it is not a thing by itself. The whole eastern part of the country is given the same rates on transcontinental business, so that the railroads could not lower the New York rates without a similar loss of revenue on the vastly greater volume of shipments originating, or terminating, at inland points as far west as the Mississippi River. This would be a heavy price to pay to keep a small part of the traffic, already carried at far less than the normal margin of earnings. Indeed, this very fact may help to explain why the railroads have avoided rate wars in the immediate past, and have followed a "live and let live" policy toward the steamship lines connecting with the Tehuantepec and the Panama railways. The loss would have been greater than the prize was worth. Unless the steamers begin taking on so much traffic from far inland, as to make serious inroads on this, the main part of the railroads' transcontinental business, we need not expect to see a war of rates inaugurated.

For all of this traffic, especially for traffic which does not reach the seacoast at either end of its journey, the railroads will continue to have advantages that should be almost decisive. They will avoid two transfers, with all the delay and chance of injury involved. They can carry the goods more quickly and more safely than can the steamers with rail connections at the terminals. And when the traffic goes by sea, either the shipper or the steamship company must pay the railroads for their part of the roundabout haul, thus increasing the expense of the ocean route. At present, some shipments move by water from as far west as Buffalo and Pittsburg, and from points a hundred to a hundred-and-fifty miles inland on the Pacific slope. The saving from the use of the canal may be equivalent, at a liberal estimate, to an extra haul of three hundred miles at the eastern end of the journey, or less than half as much in the Pacific coast states, where rates are higher. How formidable this widening of the steamers' sphere of influence will prove, is a matter that can only be conjectured. The railraods may be consoled, especially the eastern lines, by the fact that even such traffic as they may lose is not wholly lost. They will merely have exchanged a long haul at a low margin of profit for shorter hauls at more satisfactory returns, mile for mile. If the general growth of traffic is as great as is expected, the result may be no loss at all, but rather an improvement in the character of the traffic and an increase in ton-mile revenues.

If the railroads are forced to fight for the middle-western traffic, they may find themselves somewhat hampered because the present orders of the Interstate Commerce Commission place certain limits on the practice of charging lower rates to Pacific seaports than to intermediate points. This fact should prove to be an interesting incidental problem, but not, necessarily, a terrifying one, even though the Supreme Court has upheld the rulings of the Commission. The idea of these rulings is to grant exemption from the long-and-short haul clause and allow the railroads to discriminate in favor of their terminal cities, just so far as they are compelled by genuine water competition, but no farther. Now that the force of competition by sea is to be considerably increased, it is entirely possible that the details of the Commission's plan may need to be reconsidered and extensive changes made.

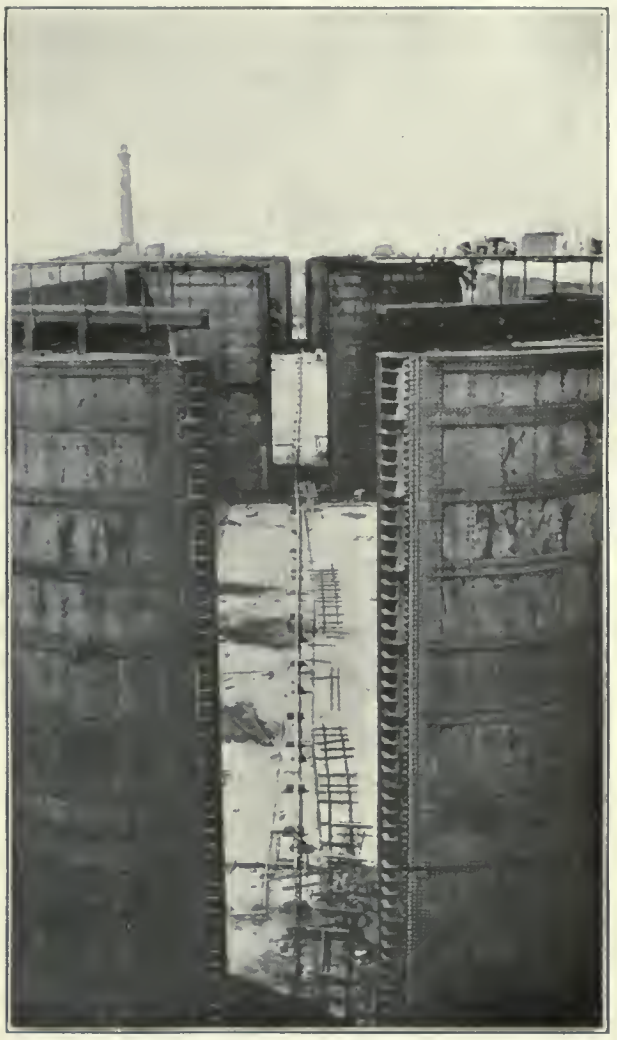
In particular, it seems unnatural that Galveston should be classed with Omaha as a place enjoying no water competition, and that New Orleans should be treated as enjoying no more effective water competition than Madison, Wisconsin. Rates from Galveston may not be higher to intermediate points than to the coast, and rates from New Orleans may be only 7 per cent higher, while from Boston, New York, Philadelphia and Baltimore, the intermediate rates may be 25 per cent higher, the through rates being forced down by water competition. At present, no regular steamship lines run from the Gulf ports to the isthmus, but with the opening of the canal we may expect to see genuine and active water competition at these points. Accordingly, we may expect that the Interstate Commerce Commission, following the principle of its first ruling,

will grant more liberal dispensations from the long-and-short haul clause, especially to the railroads serving the Gulf Ports, provided that these carriers show that they need the revenue which higher rates to intermediate points would furnish.

So far, we have been viewing the more immediate effects of the canal, and we have seen that there will be both gains and losses. Will things bear a different aspect in the long run? Will the railroads ever reach that happy state in which they will not care how much through freight is carried by the steamers? There is good reason for believing that the time will come when railroading will not be a business of "increasing returns" to anything like the same extent that it has been in the past, if at all, and when extra tonnage, carried extra long distances at extra low rates, will not be regarded as a valuable prize, but as a very doubtful asset.

For some roads, indeed, that time seems to have arrived already. To the Pennsylvania Railroad, for example, the regular growth of traffic means the outlay of enormous sums for increased plant to handle the added tonnage, over $64,000,000 having been spent thus in the last year alone. In recent years this Company has built what is virtually a separate double-track railroad to handle freight alone and relieve the main line of congestion. The expenses, for various reasons, (not all connected with increased traffic) are growing actually faster than the income. Under such conditions, it is far from true that added traffic always pays, so long as it brings in

TOWING ENGINE CLIMBING RUNWAY.



LOOKING THROUGH GATUN LOCKS.

anything above operating expenses. A road in this condition need not mourn if a competitor kindly relieves it of some of its least profitable business.

The condition of the lines east of Pittsburg can, in itself, hardly have much bearing on the question at issue, for these lines are comparatively indifferent to canal competition in any case. But we are looking into the future, to a time when lines farther west will be approaching a similar condition. At present, it is the western roads, rather than their eastern connections, which are chiefly responsible for the disregard of distance that characterizes our transcontinental freight rates.

When the plant was partly idle, more tonnage was a boon at almost any price. But as traffic becomes more dense, the motive to discriminate becomes weaker and weaker. Thus the western lines made low rates to fill their eastbound empty cars with lumber, with the final result that the policy was too successful. The cars were more than filled, and further shipments of lumber were chargeable with the cost of added rolling stock, and the haul of empty cars westward, as well. This is an extreme case, but typical.

The western roads have, of late, been spending many millions in enlarging the capacity of roadbed and rolling stock, while the moving of freight through Chicago, St. Louis, and other western cities is a great and growing problem, calling for huge capital expenditures. No traffic is self-

supporting which does not contribute its full share toward the interest on these outlays. When congestion turns railroading into a business of diminishing returns, the traffic that was once eagerly sought for at extra low rates, may become an actual burden, to be borne grudgingly, and only out of consideration for the many interests that are always dependent on an established adjustment of charges.

Across the arid and mountainous stretches of the West the tonnage will hardly grow to this extent, and the officials in charge of these divisions may never cease to cast covetous eyes at the water-borne traffic. But as the rest of the country grows up to its transportation facilities, we may expect that the carriers in general will soon cease to lament the business the canal has taken away, while they will continue to enjoy the more attractive business which the many-sided growth of the country will bring with it.

Let us suppose that the canal has taken its place in our commercial system and our growing population and industry have adjusted themselves to it. The railroads will then, as now, be facing the problem of providing billions of capital to meet the transportation demands of our ever-growing country. What would they say then to a proposal to close the Panama waterway to all coastwise traffic, and throw upon them the responsibility of raising funds to provide facilities for a sudden increase of relatively low grade business? One can hardly imagine them actively advocating the passage of such a measure. On the contrary, if, in the year 1950, an earthquake should destroy the canal, it is quite possible that among those who would view the catastrophe with the most sincere grief would be the heads of the great railroad systems of the country.

THE REMOTE EFFECTS OF THE PANAMA CANAL.

By John Bates Clark, ph.d., l.l.d.
Professor of Political Economy, Columbia University; Director of the Division of Economics and History, Carnegie Endowment for International Peace.

What, after all, is the Panama Canal? Is it merely a ditch, forty-nine miles long, and are the two ends of it respectively at Panama and Colon? In a truer sense it is a connecting link between two vast systems of canals comprising the water routes which radiate from the two terminal harbors to every part of the earth. If we consider that every "steamship lane" is in effect such a line of water communication as a canal furnishes, though better than any artificial canal can be, we may say that the excavation across the narrow isthmus of Panama has at one stroke united some hundreds of channels lying eastward from America with an equal number lying on the western side. A myriad of long routes for travelling by water meet and intersect in the small canal zone.

It is a truism that commerce binds nations together and that the international bond is closer the more dependent on each other the nations come to be. The commerce between a country having much land and few people and one that has little land and many people is essential to both of them. England thus clothes other countries and is fed by them. The commercial bond is close between any two regions that in an economic way are as unlike as are temperate regions and tropical ones.

All trade is essentially barter. It pays New England to send cotton goods, paper, machinery, etc., to the West Indies in exchange for bananas and pineapples rather than to try to cultivate these fruits; and it pays the West Indian to acquire the manufactured goods thus indirectly rather than to attempt directly to make them. Densely peopled regions and sparsely peopled ones make similar gains by exchanging products. A land of shops and factories thrives by commerce with a land of flocks, herds and grain fields.

Usually countries of dense population are advanced in a technical way. They abound in mills and shops and they use improved methods and machinery. China, however, is densely peopled and its industrial methods are still primitive. The sea that separates her from America is narrower than was once the English Channel, and it might seem that here were found the countries of the greatest commercial affinity between which incentives to trade would be at a maximum.

It is not so. The mere density of the population of China, by providing an unlimited supply of cheap labor, somewhat neutralizes the effect of American machinery, and unlike as in many ways the two countries are, there is more of similarity than of contrast in their products. In both of them the internal commerce greatly overbalances the foreign. Both of them are highly civilized and have developed the refinements of life to an extent that calls for a wide range of commodities. In America the goods are made for us by the deft fingers of tireless machines, while in eastern Asia they are, for the most part, made by trained hands. The amount of labor required for a given product is enormously greater in Asia; but the difference in cost between making the goods in Asia and making them in America is far less than it would otherwise be. It is the familiar rivalry of machine and cheap labor, and while the machine wins, yet so long as it is used by an American worker, it does not win by such a margin that it can immediately drive the Asiatic worker out of his trade. If used by an Asiatic worker, it can and will do this. It is foreordained that Asia shall go the way of western lands that have put machines in the place of trained hands, and when that happens the entire world must take note of it, and the canal will have a new work to do.

In estimating the effect of the canal on the relation of the United States to South America we do not have to assume that the industry of the latter continent is about to undergo such a sweeping transformation as is to be expected in Asia. The importance to America of lanes of commerce that interseet at Panama lies partly in bringing our eastern states into connection with the western part of South America. From the Pacific states of South America we can draw ores, fertilizers, and, in general, raw products, in exchange for some other raw

products and a variety of manufactured ones. By aid of the canal we can greatly increase the volume of such traffic, but the new connection is not likely to transform the industry of the southern continent.

With Eastern Asia the case is different. From the first there will be some exchanging of raw products and much exchanging of highly wrought ones. We shall bring thence tea, rice and raw silk, and from the neighboring islands at the south we shall bring hemp and sugar and tobacco; but we shall also bring from China and Japan art products and many highly wrought specialties. We shall send to them refined oil and agricultural produce, together with tools, machines, and a varied assortment of finished goods. Our importations from Asia will thus combine agricultural products with industrial ones; our exports to Asia will do the same, and the traffic at first will be much smaller than it would be if the products of the two regions were generally unlike. Between the two lists of goods produced in North America and in Eastern Asia respectively there is not, if we take each list in its entirety, as radical a difference as there might be.

The character of the traffic between these vast regions will change much with the rapid modernizing of Asiatic production. We have not merely to look at China and Japan as they are and try to see what special advantages are at present offered by the exchanging of one or another kind of goods. Our problem becomes far more interesting when we consider what China and Japan must and will become in the near future. The machine is nearly omnipotent and may be trusted to control the history of Asia. Man makes it, indeed, but it controls him and shapes the destiny of his race. The ingenuity of one inventor devises an engine of production, and the labor of a few mechanics constructs it; but it then multiplies like a prolific animal and in the end dominates men and shapes empires. All the while it serves men like a genie of the lamp. Machines have utterly transformed the economic shape of much of the world, and they will continue to do this on a grand scale as soon as the close connection of Eastern Asia with Europe and America shall have produced its natural effect.

Asia is bound to repeat the history of Europe and America in so far as the arts of industry are concerned. How many decades this will take it would be rash to prophesy. How many detailed processes now used in the West will be adopted in the East during each decade of the twentieth century no one can positively assert; but the general fact that hand labor will gradually yield to machine labor, in Asia as everywhere else, is surer than the average fact of history. Some prophecy is surer than some history and that which predicts the triumph of the machine is one of the prophetic certainties. On this point we can reverse Webster's familiar statement and say, "The future, at least, is secure." We know that Asia will introduce machinery on a great scale, that the whole world will be powerfully affected by this change and that our own relation to Asia will be dominated by it.

This will happen partly because machinery everywhere excels hand labor; but in this case there is a further and very decisive reason for it. Machinery has its best field in a country of dense population. It takes time and a struggle to introduce the machinery of manufacturing into a new country where land is abundant and men scarce. Where land is scarce and is worked to the final limit of intensiveness, the produce per man is small and wages are necessarily low. Such a country is compelled to go into manufacturing and can afford to undersell the world in the products of it. The poverty of its agriculture is its key to success as a competitor in manufacturing. If the Chinese laborer can earn only fifteen cents per day on the farm, he can get only a little more than fifteen cents in a workshop; and when a mill with modern machinery has supplanted the workshop and is run by men who get twenty-five cents per day, it can undersell a mill in a richer land. China and Japan taken together have the capacity to become ultimately the great workshop of the world.

Does this mean a real "yellow peril" for the remainder of mankind? If the transformation came all at once, it might mean this, and it would certainly mean a violent overturning in China itself. If the change comes quite gradually, it may involve no peril but an assured gain for western countries and a greater one for China.

We need to know what parts of the world will be the natural customers of the manufacturers of the East. Strictly speaking, commerce is between occupations rather than between localities. The weaver and the tailor clothe the farmer and the farmer feeds them, though they may all happen to live in the same township; and it is only in a secondary way that one can speak of one country as being agricultural and of another as being industrial. Farmers buy more of the goods manufactured by their own countrymen than of goods manufactured by foreigners, and for an indefinite time—probably for centuries—this will hold true in Eastern Asia, though even a great region like this can never supply its wants altogether by its own direct production. Long before Asia will have developed its manufacturing as fully as it is now developed elsewhere it will begin to export some of the products of it, but the amount that will come to Europe and America will be restricted by several influences. Mere inertia—the slowness with which the transformation of an economic system proceeds—will protect the present generation of western producers. Japan has modernized itself with brilliant rapidity, but even she has made only a beginning in the introduction of western machinery. The question that can be intelligently asked is whether, in later generations, Western countries will encounter a real danger from this rivalry of eastern manufacturers, and whether, for fear of it, we shall suffer from a recrudescence of extreme protectionism. Shall we ever need a Chinese wall to bar out the products of China?

It is conceivable that the "pauper labor" of the East, with machinery at its command, might play the part in discussion with which we have been made familiar in the case of the so called "pauper labor" of Europe, and a prohibitory tariff might be called for in the platform of some party. As bearing on this question there are a few more points on which known economic tendencies

enable us to form assured opinions. One is that, in Asia, the different productive arts will be modernized one by one, and not all together; and another is that, for many years, the principal markets supplied by every one of these modernized industries will be found within the boundaries of the Asiatic empires themselves. If we include with Japan that portion of the mainland in which she has lately become dominant, we may say that three vast oriental empires—those, namely, of Japan, China and Russia—with all of which the Panama Canal has brought our Eastern States into closer connection, will slowly remodel their economic systems and bring them into closer resemblance to those of the West. They will do this in the order in which they are here named, Japan being the first to accomplish it, Asiatic Russia the last and the Chinese Empire being between them in the succession. It will take time to transform even the industries of the first of the three empires, and a very long time to transform those of the last.

Again, when the exporting of manufactured products from one of these regions takes place on a large scale it will seek pre-eminently those parts of the earth which offer the greatest gain from the interchange, and that means agricultural and mining regions. Raw materials and food will be what the industrial populations of Asia will chiefly need. The strongest affinity, so to speak, of such centers of manufacturing will be with the interior districts of the Chinese empire and the limitless stretches of Manchuria and Siberia. Unless political obstacles intervene, traffic of great usefulness and equally great profit should exist between these regions. The Pacific states of North America will have something to offer to the developing industrial populations of Asia, and with them, as with Siberia, the connection will be made quite independently of the Panama Canal. With Atlantic states the case is quite otherwise. Brazil, the West Indies and the old "Spanish Main" will be brought commercially within reach of Japan by the Canal route. Argentina, however, is already reachable by way of Cape Horn and the Canal will not greatly affect her dealings with the East, which will be large in any case. The products of the new industrial centers of Asia will seek out such regions as markets and if commercial "buffer states" are needed to ward off from our industrial centers the impact of Asiatic competition, these and similar regions will furnish them.

We are chiefly interested in knowing how the eastern half of the United States will be affected. It is here that industrialism has its chief home and here, if anywhere, Asiatic rivalry will be dreaded. It is therefore in connection with what may happen to this region, with its vast production, that a broad and clear view is most needed. What I venture to predict is that there will be a large increase of traffic between eastern America and eastern Asia and that the exportation of manufactured goods to that great region taken as a whole will not be reduced by the modernization of Asiatic production. The time will doubtless come when we shall import goods from the workshops of Japan and China. They will consist of special products for making which those countries are particularly well adapted. It would be strange if we should not import from that region products of silk. Thanks to the presence of machinery in America, the absence of it in Eastern Asia, and a high protective tariff, we now import from them relatively little manufactured silk; but with the tariff even as high as it is and modern machinery introduced into the East, the situation would be otherwise. It will be found, however, that every case of silk that shall come from those countries will create a demand for other manufactures in the making of which we shall for an indefinite time have the advantage. And we shall export them in greatly increased quantity because of the new and abounding wealth of the eastern lands.

The indirect effects of modernizing the industries of the East are too complex to be more than alluded to here; but it is a perfectly safe prediction that the general development which will take place in the East will make that vast region a better and better customer for the producers of the West and that an influx of riches measured and expressed in gold will be the only "yellow" incident in the case. Within the vast confines of the three great empires the "dynamic" movement that is going on will open more markets for American products than it closes. A narrow view might lead some men to think otherwise, and a narrow policy might lead a country to act otherwise than in the way that would secure for itself the largest benefit from this development.

There is an immigration problem too vast to be more than mentioned here; but it is evident that the modernization of Asia will, as far as it goes, reduce the incentives for emigrating from that continent. The richer Asia becomes, the higher will be the standard of living of its people; and this will make them better customers if they stay where they are, and will cause more of them to stay there.

In general, it is the common interests of mankind that will be promoted by the use of the Panama Canal, and the gains will be those in which all nations will participate. If we divide the world into two hemispheres by a meridian running through the Pacific and the Atlantic, the commercial center of one hemisphere will be at Panama and that of the other at Suez. At these points routes innumerable intersect, and through each of the artificial straits will pass an ever increasing volume of commerce. Relatively the increase of the traffic through the Panama Canal will be the greater, and long before the time when the full economic transformation of the Pacific countries will have been established, it will take more than one channel across the American isthmus to accommodate it. No traffic which the present generation will witness will constitute more than a tithe of that which will be seen in the future, and no figures that anyone would now dare to make will measure the wealth that will ultimately flow from it. The chief single fact about the canal is its aptitude for becoming a vital world asset, from the use of which under a far seeing policy, our land and all lands will thrive. It should be no cause of contention but a bond of fraternity and assured peace.

THE PACIFIC COAST

SAN FRANCISCO REBUILT. IN THE FINANCIAL DISTRICT.

BANKS AND BANKING ON THE PACIFIC COAST.

By J. K. Lynch, President of the San Francisco Clearing House. Vice President of the First National Bank of San Francisco.

If asked to name the particulars in which banking on the Pacific Coast differs most widely from banking on the Atlantic seaboard, we must reply that it is in the larger proportion of capital to deposits in the banks of the Pacific Coast, and in the greater rigidity of the loans in which their funds are invested. Both conditions are the direct result of the newness of the country and the consequent scarcity of capital available for the development of the great natural resources of the region. Under-capitalized enterprises lean on their commercial depositaries for funds which should be supplied by shareholders, or through funded loans repayable over a long term of years. Thus the proceeds of loans nominally payable on demand are actually invested in plant and fixtures.

This is true not alone of manufacturing concerns but also of those engaged in merchandising, so that relatively few of them measure up to the standard set for firms that can issue saleable commercial paper. The favorite form of note obligation is therefore made payable "one day after date," which means in practice, at the pleasure of the maker and only then, unless the banker is ready to call the loan and (incidentally) to dislodge the account. The one-day-after-date note, which is the successor of the overdraft, has tended to diminish the balances which the banker has a right to expect from the accounts of borrowers. The evils of this system are fully recognized and the practice is being restricted year by year, but the underlying condition from which it has resulted can only be removed gradually, and after the lapse of considerable time.

The Pacific Coast witnessed the evolution of the bank from the merchandising concern, epitomizing in a few years a process that has consumed hundreds of years in developing throughout the world.

In the mining regions the early bankers were buyers and shippers of gold dust and gold bullion, which was exchanged for merchandise. In the farming districts produce was handled in the same way and the final function of the banker, the loaning of credit resulting from the sale of produce (whether of the mines or of the fields), was an easy and natural step. In some of the more remote places the general merchant is still the banker, but the search for banking locations has been prosecuted so vigorously that there are today but few places that are not provided with a bank, the organizers frequently being willing to ignore profits for some years in order to be first in the field, and to secure that goodwill which comes from assisting in the development of the community. More rigid laws passed by the different States have also contributed to the elimination from banking of all those not exclusively in the business, and under the safeguards of either State or National laws.

The history of banking in California is typical of that on the entire coast, at least in the earlier stages of the business. Of the many private firms that began banking in the fifties but few survived the speculation and the fluctuations in trade which are characteristic of pioneer days. Failure removed the greater number; some retired in a more regular way; and the few who remained were absorbed by incorporated banks, or themselves incorporated.

From the fact that California, and the Pacific Coast generally, remained on a gold basis while the rest of the country kept the currency dollar as the unit of value, the National system made its way slowly. The first National bank incorporated in California was chartered in 1870 under the amendment to the banking Act authorizing banks to issue currency notes payable in gold. Altogether some ten banks were organized under this Act. When the Government resumed specie payments there was no further reason for the existence of the National-Gold banks, and the heavier penalties they were obliged to bear caused them to enter the National system on the same terms as the banks throughout the country. The majority of the banks in the central and northern portions of the State remained under the State system, and it was not until the passage of a severely restrictive Act known as the California Bank Act of 1909, that some of the largest banks changed to the National system.

San Francisco was recognized as an important

link in the chain of international exchange operations from an early date, and English and French banks established branches which had an important part in the development of the Coast. The Canadian joint stock banks also entered the field, and two of them still maintain flourishing branches in San Francisco.

In the southern part of California, with Los Angeles as the financial center, the National system made a beginning with The First National Bank of that city, converted from a State bank in 1880. Following the building of the transcontinental roads entering Los Angeles, and the consequent increase in population coming from the Middle West and from the Atlantic Seaboard, (made up largely of men familiar with the National system), it became a strong favorite in that part of the State.

While the principal commercial banks in California are now operating under the National laws, those laws have made but inadequate provision for the Savings business, which, from the beginning, had been well cared for under the State laws. In fact, one of the characteristic features of banking in San Francisco is the number of large Savings banks strongly capitalized and having deposits aggregating one hundred and eighty-five millions. Many of these deposits are not strictly savings, but represent, rather, idle funds awaiting investment by the owners. In this city the Savings banks have taken on a class of business which on the other side of the continent is in the hands of the Trust Companies.

It being generally recognized that the Bank Act of 1909 was too restrictive, and that it placed the State banks at a disadvantage in competing with the Nationals, amendments to the Act were passed at the last session of the legislature which have made the law much more flexible, and the effect has been to check the conversion of State banks to Nationals. One feature of Act which has proved popular is that permitting one institution to transact Commercial, Savings, and Trust business, a segregation of capital being required for each branch of the business. A sufficient time has not yet elapsed to determine whether or not this departmental banking will prove more efficient, and consequently more profitable, than the more specialized banking hitherto in force. In the smaller communities the departmental bank has manifest advantages, but it is not so clear that these advantages extend to banks in the large cities.

One feature of the Bank Act which is worthy of notice is the requirement to maintain a ratio of at least one to ten between the capital and surplus, and the deposits. This is no hardship in the case of a commercial bank but, in a prosperous community, it sometimes keeps the shareholders in a savings institution busy.

In spite of some features which are still regarded as unnecessarily restrictive, and which may be removed by future legislation, this Act is undoubtedly one of the best banking laws in the country, and its operations have done much to raise the standard of the State banks.

While Oregon went through the preliminary stage of banking by merchandising firms, express companies, and private bankers, the National system was initiated by the incorporators of The First National Bank of Portland in 1866,—four years earlier than the incorporation of The First National (Gold) Bank of San Francisco. While the Portland bank remained the only National bank in the State until 1882, the Nationals are now well represented, and the State is amply supplied with banking capital. The pioneer bankers in both Oregon and Washington suffered from an excess of opportunity, or rather from the excess of natural resources, lack of transportation to market, and scanty population. The proper adjustment of these three factors in the production of wealth is a slow process, and while it is going on it requires a high order of banking skill to avoid ruinous loss. In a sense, this adjustment is always going on, but the process is particularly rapid while a country is being settled; and the bankers of the Northwest met the usual number of reverses. They have emerged from the period of settlement and experiment with the banks adjusted to the needs of the community, and themselves fully understanding those needs.

The States of Idaho, Nevada and Arizona began as mining territories, and then took on stock-growing and agriculture as rapidly as the population and transportation permitted. Utah had a special and unusual beginning in that it was settled by the Mormons, who were farmers, and not miners; but mining, though delayed, came later and is still a leading industry. The banks throughout this entire region developed as the needs of the country developed, being capitalized largely from the products of the mines and the pastures; the specialization of banking from merchandising proceeding in the manner that prevailed in the other States.

The region which we call the Pacific Slope, extending from Canada to Mexico, and from the Pacific Ocean to the Rocky Mountains, is practically all included in Federal Reserve District No. 12; the exceptions being the western portions of Montana and Colorado, and the south eastern strip of Arizona, which is included in District No. 11. The figures representing the capital, surplus and deposits of the State and National banks in District No. 12, taken from the latest available sources, will fairly represent the banking capital of the region we are considering.

State	Capital, Surplus and Profits Combined Nat & State	National Banks	State Banks
California	$203,148	$100,211	$102,937
Washington	40,911	18,601	22,310
Oregon	28,065	15,061	13,004
Utah	14,313	5,627	8,686
Idaho	10,416	5,396	5,020
Nevada	4,399	2,080	2,319
Northwestern part of Arizona	3,339	1,482	1,857
	$304,591	$148,458	$156,133
		(hundreds omitted)	
Total Capital, Surplus and Profits			$609,182,000

State	Total Deposits Nat. & State Combined	Banks National	Banks State
California	$943,229	$347,542	$595,687
Washington	192,343	96,698	95,645
Oregon	118,471	60,516	57,955
Utah	68,792	24,954	43,838
Idaho	39,697	21,029	18,668
Nevada	17,262	6,816	10,446
Northwestern part of Arizona	16,589	5,706	10,883
	$1,396,383	$563,261	$833,122
		(hundreds omitted)	
Total Deposits			$2,792,766,000

Bank Deposits
(Not including "Due to Reserve Agents")

	Combined Nat. & State	National Banks	State Banks
California	$ 96,200	$ 84,710	$ 11,490
Washington	19,075	15,159	3,916
Oregon	12,907	9,744	3,163
Utah	15,173	6,335	8,838
Idaho	3,138	1,638	1,500
Nevada	848	748	100
Northwestern part of Arizona	1,244	692	1,000
	$148,585	$119,026	$ 30,007

(hundreds omitted)

Total Bank Deposits.....$297,618,000

Individual Deposits

	Combined Nat. & State	National Banks	State Banks
California	$847,029	$262,832	$584,197
Washington	173,268	81,539	91,729
Oregon	105,564	50,772	54,792
Utah	53,619	18,619	35,000
Idaho	36,559	19,391	17,168
Nevada	16,414	6,068	10,346
Northwestern part of Arizona	15,345	5,014	9,883
	$1,247,798	$444,235	$803,115

(hundreds omitted)

Total Individual Deposits.....$2,495,148,000

These figures, in a sense, measure the financial achievement of a region that had its beginning in the discovery of gold in California in 1849. They indicate the substantial foundation on which the resources of the Pacific Coast rest, at a time when the opening of the Panama Canal places it in a new relation to the rest of the world. The effect of this change in the currents of the world's commerce on particular places or special industries on the Coast is hard to predict, but when we consider the entire region there can be no doubt. The opening of a direct water-way to the Atlantic States, to the Eastern Coast of South America and to Europe, gives new markets for the products of the Coast and those products embrace almost every thing that can be grown in the temperate zones and many that belong to the tropics.

At the same time the immigration will come direct from Europe to the Pacific and the result must be the production of conditions favorable to manufacturing. The bar to these industries has hitherto been the lack of cheap power and the lack of cheap labor. The development of electric power from the unequaled water falls of the Sierras, and the production of fuel oil in large quantities (with enormous reserves in the ground), have already made power both cheap and efficient. Immigration and the natural increase in population will provide labor which should be efficient, and if so, must be cheap; for cheapness is always relative.

The experimenting which is a necessary accompaniment of pioneer days has been done; the region has been prospected; soils have been analyzed and tested; agriculture has become more scientific and efficient. This all means a larger and safer field for the banker. Increase in agricultural products; increase in manufactures; cheaper freights to larger markets, will give employment to increased banking capital with the prospect of surer net returns.

The Federal Reserve Bank, which is now in process of organization, will begin its operation almost at the time that the opening of the Canal will become effective. Under proper administration, this bank should increase the efficiency of the banking capital now in use, and should gradually raise the standard of commercial loans, by discriminating in favor of those which are liquid in character. It may also help to give the Pacific Coast that share of the international business of the world to which it is rightly entitled. It is not to be expected that this country can at once secure even its fair share of the trade of the Orient. England has been studying and cultivating that trade for centuries, and financial affairs tend to persist in established channels. England has also bought and paid for her experience in the Orient and we will have to do likewise. The original capital investment of almost every bank operating there has been lost and made good, sometimes more than once, before the business was established and profitable. Only those banks which can contemplate heavy losses with equanimity should undertake the opening of branches in that part of the world. Nevertheless the Pacific Coast—the extreme West—fronts the Orient—the extreme East—and inevitably trade will grow, and banking must find a way to follow trade.

We can look forward to an increasing banking business with countries across the Pacific, and also with South America, a land of great natural resources, where conditions more nearly approximate those in our own country. If rightly used, the disastrous war, now involving the leading nations of Europe, is an opportunity which will enable us to make a beginning in securing this business.

While fully realizing that war is destruction, and ultimately benefits no one, we, on this shore of the Pacific, can congratulate ourselves on being as far removed as possible from the scene of the conflict, and on having abundant food supplies for which the war must create an active demand. One local result of the opening of hostilities is already apparent, and it has shown us that the common use of gold instead of paper money, on which we prided ourselves as a source of strength, is really a weakness in our financial system. Gold is the current money in San Francisco, and in a very large measure throughout the Coast, and the use of reserve money for counter payment leaves us particularly exposed at a time when the whole world is scrambling for gold. Fortunately the use of currency has been gradually increasing and the additional circulation provided by the Aldrich-Vreeland bill is being used in counter payments as far as practicable. The Federal Reserve notes will, in due time, add to the circulating medium and we may look forward to a time when circulating notes and silver will be the pocket currency, and gold will remain in the bank vaults as a reserve against real emergencies. While recognizing that there are no certainties in financial affairs, we have confidence that a country which produces gold as well as silver, copper, and many other metals; which has the world's finest merchantable standing timber within its borders, and which grows the grains and fruits most in demand, will be able to retain gold enough from international exchange to keep its finances on a sound basis.

THE PUBLIC UTILITIES OF THE PACIFIC COAST

C. L. Cory.

While it may not be true that many public utility corporations of the Pacific Coast have had as many or as serious problems to satisfactorily solve as similar companies in the eastern and middle western portion of the American Continent have had to consider, especially during the past few years, yet the conditions have been decidedly different in the West as compared with the East, and some of these differences are worthy of careful analysis. In this article it shall be my aim to set forth concisely and yet somewhat fully the immediate past as well as the present situation, and the conditions governing the principal public service utilities.

What I have to say refers primarily to the urban and inter-urban electric railways rather than either to the transcontinental or local steam railroads, but I have in mind practically all other public utilities operating under private ownership, such as electric light and power, telephone, gas—both artificial and natural—and water companies.

Excepting only the advent of public regulation and control, which has caused far-reaching changes in the methods of financing, construction and operation, the most important problem with which the majority of public service companies have had to deal has been that of keeping pace with the rapid growth of business caused by the abnormal increase in population within the districts served. The census of 1910, when compared with that of 1900 for the Pacific Coast states and cities, does not really indicate the present situation. The four years since 1910, due to the advent of public regulation and control, and changed financial conditions—decidedly worse as far as public service companies are concerned—has presented by far more difficulties than the previous decade, and the rate of increase in population has been for the most part at a greater rate since 1910 than immediately prior thereto over the larger part of the Pacific Coast.

To illustrate the conditions by a single instance coming under my own personal observation, I have in mind a gas company in the principal city of southern California which had an investment in its artificial gas properties in 1910 of approximately $10,000,000, with about 90,000 customers. Three years later the total investment had been increased to $13,000,000, or additional capital required amounting to 30 per cent or at an average rate of $1,000,000 per year. During this same three-year period the number of customers had increased practically 50 per cent, or to nearly 130,000. And it was during this period of abnormal growth that the most rigid and searching rate investigations were being continuously made by the public regulation board or commission. Nevertheless, to keep up with the increased demands of the community, it was necessary for this company to procure $1,000,000 under such conditions and restrictions as existed in the principal financial centers of the country.

To raise the necessary amount of money to meet such expenditures for extensions and enlargements anywhere on the Pacific Coast is absolutely impossible, and more than one of the western public service companies that have been or are now in financial difficulties would have had no trouble whatsoever had it not been for the added financial burden resulting from what would always seem to be desirable, namely, a large, rapid and permanent growth of new business.

A notable exception is to be found in the telephone situation. The great advantage of a permanent, and practically unlimited, financial policy, founded upon truly ultimate economic principles, is here apparent. Exchanges, toll lines, and local service conduits and cables have been built in the minimum amount of time, and business and customers taken on as rapidly as the demand developed. But it must not for a moment be assumed that the necessary new capital in such large amounts could under any circumstances have been obtained in any of the most prosperous centers of population in which such increased demand for telephone service has developed.

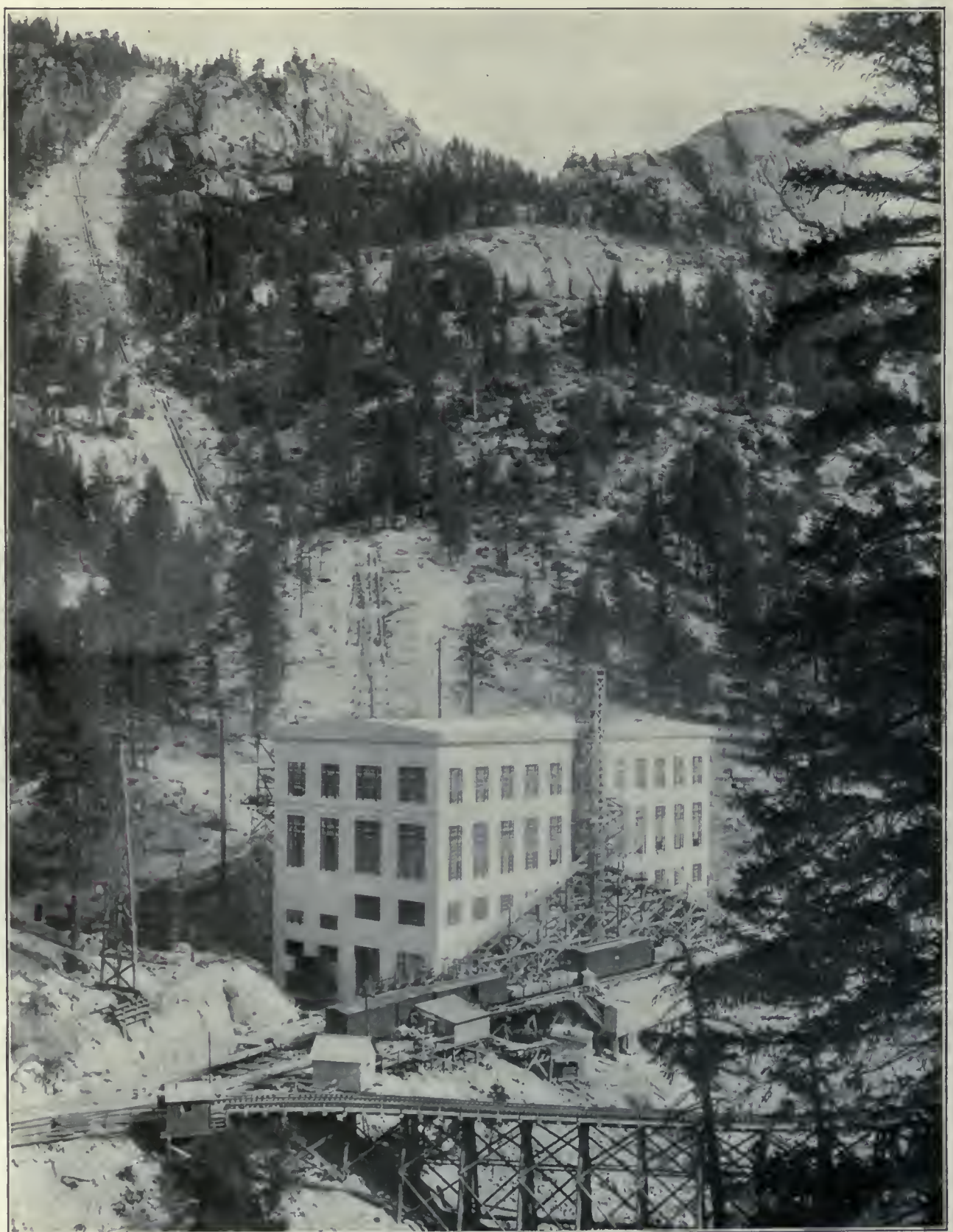
In some cases western public service corporations have been pioneers. This is true of the generation of electrical energy with water power, and its transmission at high voltage over long distances to centers of use. Such systems may now be found in all parts of the globe. In many instances fuel is used as the source of energy, the large central stations being connected with local substations by high voltage transmission lines. But twenty years ago the West was just beginning to "get electric power for nothing" from falling water, and the conditions existing during the last few years have demonstrated some new engineering, economic, and financial principles which are decidedly more sound than the somewhat false idea that it is always cheaper to generate electric power with water than with fuel consuming devices as prime movers. Experience has in the West proven that for the requirements of the larger cities a combination of water power and steam driven generating stations is the best from the standpoint of economy, as well as reliability of service. Notwithstanding the introduction of fuel oil in place of coal, which has reduced the actual cost of fuel for steam plants to less than half, and in some cases to less than one-third the cost of coal, the great economic value of the modern large hydro-electric generating system is more apparent today in the West than ever before.

I do not wish to convey the idea that auxiliary steam or other forms of fuel consuming electric generating stations are not desirable and necessary. In the majority of cases they, in reality, increase the economy of operation as well as reliability of service. But the greatest ultimate economy, in prosperous as well as lean years, demands, when conditions are favorable, the development of water power systems for the generation of power.

Except in the change to larger sizes of machines, the equipment of the most modern hydro-electric generation station has approximately

the same efficiency as those installed ten years ago. The depreciation, or reduction of worth or value, as a result of age, is decidedly less for the hydraulic development and generating equipment of a modern electric station than for a steam plant of the same capacity. There is no doubt that the first cost of the hydro-electric system may be from two to three times the cost of a steam turbine plant of the same capacity, but the depreciation upon the former will be much less, as far as present experience goes, than upon the latter.

But it is during the lean years that the hydro-electric system has a decided advantage over its competitor, the steam plant. If required, the cost of operating the hydro-electric plant for a few years can be reduced to a minimum, with no permanent injury resulting, or excessive future expenses demanded. On the other hand, however, the steam plant must be constantly provided with fuel which is permanently consumed, resulting in an ever lessening of our natural resources. In addition, the conservation and storage of water for the more uniform operation of the hydro-electric systems, not only makes possible the continuous generation of a



POWER HOUSE AND 2,000 FT. INCLINE, BIG CREEK DEVELOPMENT.

greater maximum amount of electric power, but, in the majority of cases, makes available large quantities of water for irrigation and domestic use which adds real wealth to the community.

In large electrical generating, transmission and distributing systems, both water power and steam power plants are usually desirable, each to supplement the other, but, as I not long ago heard one of the most eminent engineers on the Pacific Coast express it, the greatest economy will many times be brought about by the steam plant being operated so as to use the least possible amount of fuel. In other words, the operating engineer should strive to attain, if possible, the condition where the total amount of fuel burned is a mimimum, rather than to obtain the maximum efficiency with which the energy of the fuel is converted into electrical energy; this, of course, to be the case only when the hydro-electric generating plants will supply the maximum demand without requiring excessive investments in water storage, or other hydraulic development.

The fundamental principles set forth above in reference to the generation of electric power in hydro-electric plants are becoming more and more important in connection with the production of power for all purposes on the Pacific Coast, and the public utility companies have, during the past few years, consistently planned future developments with this end in view. From the financial side this broader basis for meeting the needs of the future should not be allowed to go unrecognized. If wisely carried out it will increase, to a marked degree, the security which will, for all time, continue to exist in investments in hydro-electric systems.

The facts set forth above, in comparing the ultimate economy resulting from the development and construction of hydro-electric generation and transmission systems in place of, or as a substitute for, the generation of electrical energy from fuel, indicate but one instance of many that might be cited where the permanent investment of a comparatively large sum of money results in a great reduction in the maintenance and operating costs, and also decidedly improves the character of the investment itself. There can be no question, however, that to obtain such greater efficiency and economy in the end, requires investments sometimes many fold greater than would be absolutely necessary to accomplish the result desired, serious consideration not being given to the increased maintenance and operating costs.

As contrasted with Eastern cities, the domestic water supply systems of the West are, in most cases, what are known as gravity systems, meaning thereby that the necessary supply of water is diverted from the mountain streams, sometimes stored, and conveyed to the place of consumption through gravity conduits so that little, if any, pumping is required, even to supply the higher levels where the manufacturing plants and residences may be located. The investment in such gravity systems, however, notably the recently completed aqueduct of Los Angeles, is very large when compared with a water supply system of the same total capacity, usually expressed in millions of gallons daily, where the water is pumped directly into the mains with comparatively small storage, as is the case in many of the large cities along the Great Lakes in the North Central and Eastern States.

In some instances, notably Los Angeles and Seattle, the bringing of domestic water from the mountains into the cities makes it possible to generate considerable quantities of electrical energy. When this is done it is, of course, apparent that additional wealth is thereby created, and but little reflection is required in such cases to convince one that the greatest ultimate efficiency and economy, and the greatest benefit to the people of the community, not only justifies, but demands, the large investments required for such extensive storage and conveying systems.

Based upon the above analysis, it is but a step to the important conclusion that, to provide for the necessities, let alone the conveniences and luxuries of centers of population, capital must be available in larger and larger amounts, as the size of the development is increased, due to the greater population and growth of industry in such communities. Rarely, is all of the capital required available, or to be obtained, in the West. Many such enterprises, whether publicly or privately owned, are financed in the East. Just at the present time there can be no question but that such enterprises, the development of which is absolutely demanded upon purely economic grounds, is being held back because of the impossibility of obtaining the necessary capital from heretofore available sources.

There are probably a number of reasons for such restriction in the financing of such permanent physical developments. Unquestionably the introduction of public service commissions, which have the power to regulate the financing as well as the rates for service rendered, has had much to do in diverting the investment of capital from such public utilities. It is to be hoped, however, that such conditions are only temporary, but at least one set of conditions which exist in some of the western states must be changed before there will be any improvement over the present most unsatisfactory situation. In some states, the regulation of all of the public utilities is not under the control of the state commission. Some of the public service companies are under such control, while others, principally in the cities, are under the supervision of the public utility boards of these different cities.

It is certainly most unreasonable to expect capital to be forthcoming from any source, if the rates of a large public utility in any city are subject to change as often as once a year, little consideration being given to the inevitable variations and increased investments, which not only may, but do occur in different years. In such instances, nothing can ever be settled, and it is foolish to presume that the public is being protected. Such is not the case. The public in reality suffers most. The stockholders in the public utility never know what is coming next,

and if there is anyone that is benefited, and I doubt if the benefit in this direction is material, it is the investment bankers, who, in order to protect themselves, increase interest rates to such public service corporations, with the result that the normal development of the industry as well as the community is retarded.

The President of the Public Utility Commission of one of the largest states on the Pacific Coast is responsible for the assertion that it is the object of the Commission to so do its work that any conservative business man will prefer to invest small sums that may be entrusted to him to invest for his immediate relatives and friends, in the securities of the public utility companies, rather than resort to the long considered safe and conservative investment in mortgages and deeds of trust.

There are many indications of a decided improvement in the attitude of mind of the investing public toward the honest, wise, and conservative public utility corporation. One of the largest hydro-electric, light, power and gas companies in the United States, which controls practically the entire business of the character carried on by it in Central California, has, within the past six months, sold in excess of $10,000,000 of its preferred stock to its former stockholders, present employees, and existing customers. The guaranteed return upon the investment is somewhat in excess of 7 per cent per annum, and there seems no question whatsoever but that the money so invested is not only secure as regards the principal, but that the interest will be forthcoming promptly when due, and, in addition, the development of the community very materially advanced.

There are other similar companies of less magnitude that are being financed satisfactorily in the same way, but the greatest possible development of such methods of financing can only be brought about by the most hearty co-operation of the public utility commissions, in their actions in reference to the financing and regulation of rates of such public utilities, and the directors, financial managers and operators of the utility companies.

Under present conditions, however, it would seem practically impossible to assist new enterprises. While money may be available for extensions and improvements of the older, successful companies, new, and as yet untried, enterprises on the Pacific Coast are receiving little or no consideration from investors of any class. Serious as this situation may be, it has its advantages. It is unquestionably very much better, at the present time, to conservatively advance the interest of heretofore successful enterprises that have been wisely administered, than to run the risk of attempting to make successful the untried enterprise, with a new organization as regards its personnel, which organization may, or may not, have the ability to manage the enterprise wisely.

Among the many developments for which there is a crying need upon the Pacific Coast, is the application of the now well-known, successful, and efficient methods of the corporation to deal with the production of wealth from what are now relatively non-productive lands. Unwise speculative individuals, with little or no ability as regards the development of land, have, within the past few years, made some monumental failures in the western states. In fact, it is somewhat of a question yet whether the United States Government itself, through its Reclamation Service, has made an unqualified success of many of its irrigation enterprises. The return upon such land projects will necessarily be slower than in transportation systems or other similar public service projects, but there seems no sound reason why, with proper management, a great land enterprise might not be operated successfully, the same as a transportation system, or large manufacturing company. In the West the development of water, either by storage, pumping, or the diversion of natural stream flow, is usually necessary in such land projects, and it has been in connection with the satisfactory supplying of such water that many false estimates as to the relation of the cost to the quantity of the water obtained have been made. This fact, coupled with the speculative character of many land schemes, has resulted in serious financial failures. The element of time must be taken into consideration, as it has not been heretofore, and the profit cannot be obtained in any other manner than from the land itself, as a result of its increased producing power. The usual plan of purchasing the raw land in great areas at low figures, the development of an adequate irrigation system, and the sale of such land on easy terms in small tracts at a large apparent profit, in most instances, has resulted in placing the burden of development upon the purchasers, who are not only the least capable of overcoming the inevitable difficulties involved, but are not able financially to provide the necessary funds to prosecute the work with the greatest efficiency.

Proper encouragement from the legislative and state regulation boards toward large land operating corporations, conducted upon a far-seeing and wise financial policy by capable administrators and managers, will unquestionably result, in the near future, in the success of such agricultural corporation enterprises.

In conclusion, it may be said that, for the most part, the public utility companies of the Pacific Coast are in a sound financial condition, with excellent prospects for the future. Some errors that have been made in the past must be corrected, not only within the management of the companies themselves, but in the attitude of the public towards such utilities. The elimination of unrestricted competition has been most beneficial, and a liberal policy toward public utility companies by the various State Commissions, coupled with a consistent effort on the part of the managers of the utilities to be scrupulously honest with all stockholders and to give the best possible service at a reasonable cost to their customers, will serve to attract the necessary capital required for the greatest ultimate efficiency and economy in operation.

THE WEALTH OF THE WEST.

THE PRESENT STATUS OF WESTERN IRRIGATION.

By Walter V. Woehlke.

(Contributing Editor Sunset Magazine; Author of "Water as Wealth"; "The Water Savers"; "The Land of Before and After," etc.)

No other important industry of the West has carried a heavier burden of adverse circumstances than irrigation. Since its inception in 1847, when the Mormons under Brigham Young raised the first American irrigated crop, the industry has been beset by an endless series of difficulties, the chief of which was ignorance. Though irrigation is one of man's oldest arts, the American settlers who ventured into the West's arid valleys and plains did not know its ABC. In the construction of dams and diversion works, in running the lines for the ditches, they had no engineering advice; no instruments. No precedents guided them in the preparation of the land for irrigation or in the application of water to the crops, and the accumulated experience fund of one district was inaccessible to nearly all others on account of isolation.

The miner's hand was raised against the irrigator. In the early years the law, in disputes over water, favored the miner at the expense of the farmer. After the miner abdicated as boss of the West the cattleman usurped the throne, and the cattleman's most precious possession was the water front; the right of exclusive control, by fair means or foul, over the streams of life-sustaining moisture crossing the parched range. This possession he defended against the homesteader, who was the irrigator, during a war that lasted for thirty years.

The laws governing the disposition of the public domain, cut to fit conditions in the humid region, blocked the path of irrigation and encouraged speculation. Worst of all was the insecurity of water titles. The owner of a water right could never be certain of its continued possession. At any moment a newcomer might divert half of his water from the stream above. The enlargement of a ditch higher up might leave the stream dry, the farmer ruined. Against this robbery he had no redress except an appeal to the courts. The law considered a water-right to be personal property; there was no public supervision over the West's most precious possession. The acquisition of public land was regulated by ever more stringent provisions. Records were kept and every care was taken to protect the title of the freeholder. Water titles, however, through the utter lack of a comprehensive irrigation code, were as unstable as the element upon which they were based. Endless litigation over water-rights clogged all the courts in the irrigation states, but the decrees resulting from the law suits could not be enforced except through more litigation or by force of arms.

Despite these drawbacks, serious enough to choke a less vital industry, irrigation expanded. In 1899, when irrigation enterprises were first made the subject of detailed Census investigations, the West had become, in point of area, number of enterprises, length of canals and ditches and of capital invested, the third largest irrigated district in the world, yielding the palm

only to India and China. It contained 107,716 farms irrigating a total area of 7,527,690 acres, and the irrigation works represented an estimated capital outlay of $67,482,261. This rank was attained in spite of the fact that, in the preceding decade, construction of new works had been almost at a standstill.

Between 1870 and 1890 canal construction kept ahead of settlement. From 1890 to 1902 when the Reclamation Act was passed, the number of new enterprises was small. In 1903 the revival began and by 1910 the total irrigated area had increased to 13,738,485 acres, the canal mileage had grown to 125,591, 6,812 reservoirs with a total storage capacity of 12 million acre-feet had been built, and the capital invested in irrigation enterprises had increased to $307,866,369. The farmers themselves owned eighty per cent of all irrigation systems.

But these figures do not tell the whole of the remarkable development. In 1910 construction had again outstripped settlement. Water was available for almost 20 million acres, yet fourteen million acres only were irrigated. And the projects initiated and under way in 1910 included an area of 31 million acres, with an estimated final investment of $424,281,000 in all projects reporting that year.

These statistics indicate a continuous, rapid growth in the development and utilization of irrigation water but they do not answer that most important question: Does irrigation pay? The correct answer to this question not only determines the safety of the money invested in completed and uncompleted irrigation enterprises; it must also have a tremendous influence upon the future growth and development of the entire Pacific slope and upon every investment made in this territory. The ratio of the West's industrial and commercial development must largely depend upon the density of the rural population. A minimum of forty million acres can be added to the present irrigated area. Divided into eighty-acre farms (the average unit will be nearer forty acres) this area will support a strictly rural population of three and a half million souls, plus an equally large additional urban population—if irrigation pays.

A population of seven millions is practically the equivalent of the entire population throughout the arid and semi-arid West in 1910.

The U. S. Census Office of Agriculture in 1910 estimated the average value of crops produced on irrigated land to be $25.08 per acre; for crops grown throughout the country under humid conditions, without irrigation, the estimated value was placed by the Census office at $17.54 per acre, showing a greater crop value per irrigated acre of 43 per cent.

These estimates, however, were based solely on the comparative yields of field crops; wheat, alfalfa, barley, oats, potatoes, sugar beets, timothy and clover. The high-priced crops such as orchard fruits, berries and small fruits, tropical and subtropical soil products, nuts, grapes and vegetables did not enter into the computations at all. Had these high-priced crops been added, the crop value per irrigated acre would have been considerably higher. Nor should these products be omitted in a discussion of the present and future status of Western irrigation, as they constitute a far larger percentage of the total soil output in the irrigation states than in the rest of the country. In the North, according to the 1910 Census, the output of vegetables and potatoes, of fruits, nuts, grapes and berries aggregates 10.8 per cent of the total crop value; in the South the percentage is 9.8; in the West it rises to 24. For the three Pacific states, California, Oregon and Washington, the percentage of these high-value products climbs to 29.5, or almost one-third of the total value of all crops. As a result of this extensive specialization in crops of more than average value the yield per irrigated acre in the state of Washington reached $49.82; in California $43.50; in Texas $45.43 as against a general average of $25.08 for all irrigated land.

With systematized distribution, with energetic selling campaigns conducted by co-operative associations of the growers, with laid-down costs in the Eastern markets reduced to those districts located close to tidewater through water transportation via Panama, with Europe accessible through the Canal and with ample refrigeration capacity to handle the potential traffic in perishable products, the proportion of the West's high-value crops to the total yield can be raised to 35 or 40 per cent in the next ten years without filling domestic and foreign markets beyond the saturation point.

There is still another factor bearing on the profit of cultivating irrigated land which the Census enumerators did not, and could not, take into consideration. They could make no distinction between land having a full supply and that having only a partial supply of irrigation water. Though there were no statistical data available on the subject, the irrigated area which has only a partial, irregular supply of water must by far exceed a million acres. More than sixty per cent of the entire irrigated area depends upon the variable flow of the smaller streams for its water. Many ranches merely have a flood-water right. Late appropriators on fully developed streams—and their number is legion—must be content with one or two irrigations because the demands of prior appropriators absorb the entire available flow long before the end of the growing season. Of the 508,000 acres reported as irrigated from the San Joaquin River, for instance, 125,000 acres are merely unbroken pasture land flooded during periods of high water. The elimination of this partially irrigated land, most of which will eventually have a full supply through flood-water storage, would materially add to the average acre yield of the balance.

If irrigation pays, how does it happen that irrigation bonds to the amount of $25,000,000 are in default; that approximately five million acres for which water is available lie idle and unproduc-

tive? What has caused the Eastern investor to lose faith in irrigation securities? Why did the stream of settlers shrink instead of broaden during the last three years?

The answer to the last question lies close at hand. The investment in the irrigation systems of the 7,500,000 acres watered in 1899 averaged $8.89 per acre; the cost of the systems constructed in the following decade rose to $37 an acre. Still, this increase alone could not have checked settlement. Far more serious than the higher cost of the water-right was the increasing price placed upon the irrigable land. Raw land which, dry, would not fetch $10 per acre in the open market became the subject of speculation as soon as a supply of irrigation water was in prospect and passed from one speculator to another until its price, exclusive of the water-right's cost, reached $75, $100, even $150 per acre. In Idaho relinquishments of desert entries on land which *might* come under a Reclamation Service project sold for as high as $40 an acre; lieu-land scrip entitling the owner to select and obtain patent to public land which was vaguely, tentatively included in the preliminary survey of a government project brought $30 an acre.

This upward movement of land prices saw its culmination in 1912. Since then reason has returned and prices have come down. Lieu-land scrip has dropped to $10. The Northern Pacific railway, for instance, cut the price of some of its land included in a government project from $90 to $35 and refused to sell except to actual settlers; the Southern Pacific Company cut the appraised value of its holdings under the Truckee-Carson project, Nevada, from $30 to $15 an acre and placed a similar restriction upon buyers; in the Rio Grande Valley the Water Users' Association obtained options on all the excess holdings of its members under the Elephant Butte project and is disposing of the land at prices forty per cent lower than those demanded by private owners or promoters of private enterprises two years ago.

Though the reduction in the price of raw irrigable land has been universal throughout the West in the past two years, except in those districts of suburban rather than rural character, this drop in the general price level is insufficient by itself to bring about the speedy, full utilization of the raw land for which water is now available, or will be within the next few years. It must be supplemented by a radical change in colonization methods.

IRRIGATED LAND IN THE "INLAND EMPIRE," NEAR SPOKANE, WASH.

The Reclamation Act was passed in 1902 after a five years' campaign financed by the Western railroads. One of the principal arguments used by its proponents was that the federal government would not be called upon to appropriate a dollar; that the receipts from the sale of public land would create the reclamation fund and that the settlers would perpetuate this fund by paying back into it the cost of every project within ten years from the opening. In other words, the proponents of the measure asserted that the homesteader would be able not only to trans-

form a piece of raw desert land into an improved, self-supporting farm within a year from the delivery of the first water, but that he would also be able to retire the entire construction cost within ten years. Following the lead of the Reclamation Act, the promoters of projects under the Carey Act likewise divided the payment of water-right charges into ten annual instalments and issued ten-year bonds against them. In undertakings on private land the repayment period was usually reduced to periods of five, six or seven years.

Costly experience has since shown that the average settler requires not one but five years merely to transform the desert land into an improved, self-supporting farm; that he cannot begin to repay the cost of the irrigation system until after the fifth year, and that the burden will be too heavy on him unless the total term of repayment is extended over a period of at least twenty years. On a majority of the surviving Carey Act and on all of the Reclamation Service projects the twenty-year extension in the time of payment has since been, or will be, made. But the hardships imposed upon the settlers through the lack of knowledge on the part of the promoters, the ill will and prejudice engendered through the numerous settlers who lost their land and improvements because they could not meet the payments, have made colonization difficult and slow. When there is added to the annual water-right instalment, to interest on deferred payments, to the charge for maintaining and operating the system, an annual instalment on the cost of the land itself, the task of the settler becomes almost impossible.

Colonization methods, however, are beginning to change in accord with the new conditions and the new experience. Promoters of irrigation enterprises have learned that their success and profit depend upon the settler's success. A number of the commercial irrigation undertakings owning both the land and the water are beginning to improve various units of their holdings out of their own funds, to level, ditch, seed and crop the land prior to the coming of the settler, thus producing an income whether the land is sold or not. In addition several concerns are assisting the settler by supplying him with dairy cows and stock on favorable terms. However, this change of the promoter's attitude toward the settler is sporadic only. The isolated instances of this practice merely indicate that the promoter is just beginning to see the relation of his own to the settler's success. From this phase of colonization to the ready-made irrigated farms of the Canadian Pacific Railway, or to the state loans made by Australian boards to new irrigation farmers is a long step. Advance in this direction is made difficult by the restricted market for irrigation securities.

The apparent inability of the engineering profession to furnish a reliable estimate of a project's ultimate cost is one cause of defaults in irrigation securities. Underestimating the cost of an irrigation system is an ancient fault. It almost disrupted the enterprise of the Greeley colony, Colorado's irrigation pioneer. The colony's engineer estimated that four ditches would be needed to water 120,000 acres, and that their cost would run to a total of $20,000. The first ditch cost $30,000 and was too small to irrigate even 2,000 acres. When this ditch was finally enlarged and finished it watered 32,000 acres and cost $112,000. Since that time inadequate cost estimates have ruined scores of enterprises with monotonous regularity. Financed in accordance with the engineer's figures—often dictated by the promoter, it must be admitted—construction is begun, settlers appear, make improvements and wait for the water that does not come because available funds are exhausted long before completion. Since the settlers receive no water or an intermittent, insufficient supply, they can pay neither interest nor principal. Both bondholders and settlers lose hope and the half-finished project is abandoned.

Such underestimating of cost is not at all infrequent. On the Twin Falls South Side project, the largest and most successful Carey Act enterprise in Idaho, the actual cost exceeded the estimate by almost one hundred per cent, and absorbed the entire profit expected from the sale of the water-rights. But the successful colonization of the 200,000-acre tract, together with the activity on nearby projects began under different auspices, raised the value of the townsite to such an extent that the promoters' profits attracted the attention and envy of other promoters and inaugurated the long succession of more or less speculative Carey Act projects whose collapse is largely responsible for the present odium attached to irrigation bonds. On nearly all of these projects not only the cost but the quantity of the available water was underestimated. On some of these enterprises the engineers made no measurements, had no records of the run-off. They surveyed the stream's drainage area, estimated the average precipitation over the watershed and from these data computed the run-off which, in turn, determined the area included in the project and the cost per acre. One project upon completion had water for only 36,000 acres, though water-right contracts had been sold to cover 65,000 acres. Upon investigation it was found that the engineer had included in the watershed a large area which drained into an entirely different stream, whose run-off did not reach the project's ditches at all. The bondholders and settlers paid heavily for this oversight.

A combination of insufficient capital and insufficient water ruined the Carey Act project which is now being completed jointly by the State of Oregon and the Reclamation Service. Another project in Idaho which had to be taken over and refinanced by the bondholders cost them a million dollars because the promoters had included in the total area of 60,000 acres a tract of 20,000 acres consisting of rough, broken lava scab land unsuitable for agriculture. Since the contract with the state called for $50 per water-right the elimination of these 20,000 acres cost the bondholders a million.

Shoestring promotion played its part in the demoralization of the irrigation-bond market. The Twin Falls Land & Water Company had its project eighty per cent completed and paid for out of its funds before it issued bonds, and these bonds, owing to the success of the enterprise, were retired in short order. Several succeeding projects tried to make up for the promoters' lack of capital by financing the enterprise wholly through bonds and through the sale of water-right contracts to settlers almost before construction had begun, with disastrous results, of course. The only large shoestring promotion which succeeded of late in creating a prosperous irrigated district was the California Development Company, and this concern, despite the settlers' success, is in the hands of the receiver. But the project it initiated, the Imperial Valley, has added more than 300,000 acres to California's irrigated area in twelve years.

Underestimation of cost, overestimation of the available water, engineering mistakes, faulty and sometimes fraudulent financing, poor management, inflated land prices, higher cost of water-rights and wrong colonization methods are responsible for the present status of irrigation, for the bad odor of its securities and for the decline in the demand for irrigated land. Results from cultivation not at all up to the level of the rosy predictions likewise helped to cut down the number of settlers.

The worst has been said. It needed saying. Recognition of past mistakes and a sincere effort to avoid them in the future constitute the only basis upon which to renew building activities. Without this recognition of past errors in methods no correction is possible, and without this correction the task of reassuring investors, of restoring confidence in irrigation securities is practically impossible.

That at least some of the lessons contained in past mistakes have been learned is shown by the adoption of model irrigation codes in half a dozen Western states during the last ten years. Insecurity and instability of water titles constituted one of the most discouraging features of the situation. So long as no efficient public supervision over water filings, diversions, and distribution was exercised, water titles were in a chaotic condition, sound development was hampered and restricted and litigation was encouraged. During the last ten years Oregon, Washington, Utah, Nebraska, South Dakota have followed the lead of Wyoming and Colorado and adopted comprehensive irrigation codes providing for strict supervision of all water filings, for an efficient system of recording priorities and for an intelligent method of determining the extent and measure of every water-right on all streams. The California legislature likewise adopted a comprehensive irrigation code at its last session which aimed to place the state's entire water resources under the supervision of a special commission, but the opposition succeeded in sidetracking the law by means of the referendum petition. The act will be submitted to the voters in November and, if approved, will become operative immediately. Its passage will gradually diminish the astonishing volume of water litigation that has cost the Californian irrigators millions of dollars, and it will set free for use and development vast amounts of flood water now controlled by riparian owners, as the act makes the common-law doctrine of riparian rights inoperative in the state.

The gradual change in the attitude of the promoters toward irrigation projects is as important and as far-reaching in its effects as the adoption of comprehensive irrigation codes. In the early period of extensive ditch building, between 1880 and 1890 when English and Scotch capital was freely invested in new enterprises, the irrigation companies endeavored to make a profit both out of the sale of water-rights and of the water itself; to retain possession of the ditch system after the water-rights covering its full capacity had been disposed of. The majority of these water companies were disappointed in their expectations of profit from operation. The power to make rates for the delivery of water to the owners of water-rights was vested in local bodies, usually in the boards of county commissioners or supervisors elected by popular votes. The water users had the votes, the water companies did not. As a result rates were fixed at so low a point that the companies, as a rule, were glad to turn the ditch systems over to the farmers. One instance is on record in which the county commissioners fixed a rate of 20 cents per acre for water delivery despite the vehement protest of the water company. When the farmers took over this system they found that the actual cost of maintenance and operation the first year exceeded $1.15 per acre. On the other hand, when the settlers under the Twin Falls South Side project assumed the management of the canal system they cut the water rate the first year from 90 cents to 15 cents per acre. The following year they had to spend $300,000 to put their neglected ditches in order.

During the last fifteen years irrigation enterprises have ceased to expect profit from operation. The sale of the water-right, of the land, or of both, is the only source of profit in the modern undertaking. Hitherto, periods of five to ten years were considered ample for the repayment of capital investment plus profit, but the experience of the last six years has shown the fallacy of this assumption. A twenty-year period instead of five years is now accepted as the minimum. This change will shortly make itself felt in a stimulation of the demand for irrigated land, and there are indications showing that this increase in the time of payment will not remain the only concession to the settler. Financial assistance to the colonist, either in the form of improved land or in loans for improvements and the purchase of stock, is gaining favor, but it is always accompanied by a careful selection of the beneficiaries from the mass of the applicants.

A marked tendency toward stricter, more efficient public supervision over private and quasi-public irrigation enterprises is even more important in the ultimate restoration of confidence in

IRRIGATING ORANGES, LOS ANGELES COUNTY, CAL.

irrigation securities. A large share of responsibility for the failure of numerous Carey Act projects must be placed upon the shoulders of state officials who failed to protect the interests of both investors and settlers; who lent the name of the state to the enterprises and then allowed the promoters to do as they pleased. Adequate preliminary investigation of the engineering features; determined, vigilant supervision over both construction and finances; insistence upon adequate bonds; refusal to allow the sale of water contracts before water is ready, would have forestalled ninety per cent of the failures. Though the collapse of numerous projects has jarred the state officials into action and though a recurrence of the old *laissez-faire* conditions on a large scale is impossible, the change has come too late. In future large irrigation enterprises, the state, no matter how efficient its supervision, will have to lend more than its name; it will have to lend its credit as well and guarantee the bonds of the project to finance the enterprise, for the memory of the investor is longer than is usually supposed.

The California legislature in 1887 passed the Wright Act authorizing the formation of irrigation districts which were given the power to issue bonds for the construction, improvement or enlargement of irrigation systems. Forty-one districts were organized under this law. All of them issued and sold bonds; most of them defaulted in the payment of both interest and principal. Inexperience, mismanagement, politics, attacks upon the legality of the bonds by the large landholders opposed to the formation of the district, all brought about the financial fiasco. That was twenty-five years ago. Since then the Wright Act has been strengthened, its weak places have been reinforced, two large districts have demonstrated the successful working-out of the new law, but nevertheless the memory of the initial failure still lingers and irrigation-district bonds are a drug on the market. Though the state has placed the district bond on a legal parity with municipal bonds, still these securities are unsalable except at a heavy discount.

It is an anomalous situation. In the Turlock-Modesto irrigation district, for instance, the prosperity, yea the very life of the two thriving towns is based on the success of the water system, on the prosperity of the district. Without the water supplied to the dense rural population by the district, the towns would revert to the condition of insignificant hamlets. The municipal and school bonds of these communities have always sold at par or better; the basic securities, the bonds of the district, supported by the power to levy taxes both on city and country property, have gone begging far below par.

Despite this deep-seated prejudice the irrigation-district plan of financing and carrying out irrigation projects will probably supplant private initiative in the larger enterprises of the future. There are two reasons in favor of the district plan. In the first place it will be impossible for years to come to market bonds issued by private

irrigation enterprises of large size, no matter how strict public supervision over these enterprises may become. Through proper legislation providing for stringent preliminary investigation by competent, non-political commissions of technical and legal experts, unsound district projects can be practically eliminated, and the various Western states can well afford to lend their credit to feasible, sound enterprises under the district plan, either by guaranteeing the interest on the district bonds or by making the issues incontestable before they are placed. This method presupposes rigid state supervision over all district projects from their inception to their completion.

The chief irrigation development of the future, however, is predicated upon an extension of Federal activities. It has been shown that the average cost per acre rose from $9 for enterprises initiated prior to 1900 to $37 for the projects completed in the subsequent decade. The bulk of the irrigable land as yet unreclaimed must depend for its water supply upon the West's large rivers; upon the Colorado, the Green, the Grand and their important tributaries; upon the Sacramento and the Columbia. The magnitude of the task involved in storing the flood waters of these rivers, of diverting the storage and placing it upon the high-lying irrigable lands makes the undertaking impossible either for private or state enterprise. To place water from the deep gorge of the Columbia river upon the two million fertile acres of the Horse Heaven plateau in central Washington, for instance, would require the construction of a main canal five hundred miles long. On the Colorado river water must be stored in Colorado and Wyoming for use in Arizona and California. Comprehensive development of the Sacramento river watershed is possible only through state and federal co-operation. It will be some time, though, before the scope of the U. S. Reclamation Service can be enlarged, before a method of co-operation between states, districts and the national government can be worked out.

In the meantime the most pressing problem before the irrigated West consists of the colonization and cultivation of the 6,000,000 acres for which water is now ready. Almost $200,000,000 are tied up in these idle parts of the various enterprises. By extending payments over a minimum of twenty instead of five years, by relieving the settler of all charges except for maintenance and operation the first four years, by judicious loans for improvements or for the purchase of stock, the rate of settlement can be increased materially. The first part of this colonization program promises to be adopted almost generally on new enterprises throughout the West, and the example of the Canadian Pacific Railway is opening the eyes of irrigation managers to the need and effectiveness of a first-aid-to-the-new-settler plan. The prospect of a speedy settlement of the fallow, unproductive area under existing ditches is better than it has been for the past two years on account of deflated prices of raw land and a decided drop in speculation and speculative values.

Compared with the rest of the West, California has always occupied a place apart in its economic development. Two features distinguish the growth and development of Californian irrigation from the development of the industry in other parts of the West. One of the great obstacles in financing irrigation enterprises outside of California has been due to arid conditions and to the public ownership of the land. Arid land without water has no value as security, nor can it be given as security for a loan until title has passed from the United States to the entryman, and reclamation by irrigation is a condition preceding the granting of patent. In California, however, by far the largest part of the irrigable area is only semi-arid, will produce grain and forage crops without irrigation and therefore has earning power and value prior to irrigation. Again, the bulk of this land has been in private hands, producing revenue for fifty years. And where the land was both arid and in public ownership, as in the Imperial Valley, construction was so inexpensive that the notes and cash payment of the entrymen, averaging $10 per acre, sufficed to build the canal system. Furthermore, California's climate made possible the cultivation of a tremendous range of high-priced products almost from one end of the state to the other, a distance of 800 miles. As a result of these favorable circumstances, and in the face of the chaotic conditions of water titles, California has been able to finance its irrigation projects without going far beyond its borders. The thousands of mutual water companies, for instance, always find a ready market for their securities within the state. Eastern bond buyers, judging the value of a bond by the net earnings of the concern issuing it, rarely touch these securities because the mutual water companies, being co-operative in their organization, show no earnings, their revenues being raised by assessments upon their shares. Experience has shown, however, that the moral security behind these bonds is excellent; namely, the earning power of fully developed ranches and orchards whose owners know that the mortgaged water is the basis of their prosperity.

Still, California has by no means been exempt from loss through speculative promotion of irrigation enterprises. It is only necessary to mention the Solano project, partially financed with funds taken from the treasury of the United Railroads of San Francisco, to illustrate conditions. But whatever loss has been occasioned through irrigation failures in California has fallen largely upon the promoters, their associates, and creditors and upon the purchasers of land; the Eastern market has been in no wise affected.

Nor has the Eastern investor been called upon to finance the large area that has been reclaimed by wells during the last ten years. In 1910 13,906 pumping plants and 5,070 flowing wells irrigated a total of 622,025 acres. Since then well irrigation, born and perfected in the southern third of California, has made remarkable strides. Where a lift of 30 feet was considered the practicable limit ten or twelve years ago, improvement in the efficiency of pumps and internal combustion en-

gines, reduction in the cost of liquid fuel, substitution of distillate and tops for gasoline, the advent of cheap hydro-electric power in the irrigation field have doubled the economic range of the lift even for field crops. Flowing artesian wells were discovered in numerous districts of Nevada, California, Arizona, New Mexico and Washington. Throughout the great interior valleys of California pumping plants began to water areas which, under gravity systems depending upon stored flood water, would have to wait years for their full development.

Judging from the performance in the past five years the most profitable employment of capital in irrigation enterprises within the immediate future will be in the outright purchase of water-bearing land, in the installation of well-irrigation systems watering small units which, seeded to alfalfa, will be colonized more speedily than large irrigated tracts without improvements. How large this potential field is may be judged from the fact that in India 16,000,000 acres are irrigated from wells.

From the foregoing it appears that the period of private, largely speculative irrigation enterprises in the West is almost over. The bulk of the new work must in the future be undertaken either by the state and the federal governments or by irrigation districts with federal or state aid and supervision. Not only does the condition of the bond market make such a change necessary in order to give the cautious investor and investment banker a guarantee against default, but the very nature of the work points to the necessity of public rather than private enterprise. Most of the remaining large projects will at least be as costly per acre as the works so far put up by the Reclamation Service. Had the Reclamation Service work been financed through private channels, the bonds based on the settlers' promise to repay the construction charges in ten years would have been in default long ago. Even admitting that private work can be done at smaller cost than public work, the acre-charge of the greatest remaining projects must of necessity be so high and the unproductive period so long that private capital will hesitate in entering the field except under public guarantees, irrespective of the present position of irrigation securities. And the trend of all the agencies working for the development of the Pacific Slope's irrigation resources is directed toward the harmonizing of federal, state and district activities.

It must not be understood that private capital and enterprise without public guarantees will cease to participate entirely in future work. Far from it. In California the irrigated area was lifted to 3,250,000 acres without public aid or supervision of any kind and several million additional irrigated acres will be added solely through private undertakings. When it is considered, however, that the total area which will ultimately be irrigated in the state is close to ten million acres it will be seen that the commonwealth must inevitably play a most important role in the work before the task is finished.

COTTON IN THE IMPERIAL VALLEY, CAL., RECLAIMED BY IRRIGATION FROM DESERT WASTE.

WATER POWERS OF THE PACIFIC COAST.

By W. E. Herring, of Stone & Webster.

The Pacific Coast presents many unusual features in connection with water power developments. The Cascade mountains, starting at the British Columbia line and extending southerly through Washington and Oregon, giving place to the Sierra Nevada mountains extending southerly through California, parallel the Pacific Coast line at a distance of 100 to 125 miles. Streams rising in these ranges of mountains and flowing westward are fed by numerous glaciers and snow fields, and fall from average elevations of from six to ten thousand feet to the flat plateau country, the average elevation of which is about 500 feet. This fall takes place within comparatively few miles and an enormous head can be obtained on any of the streams. In the Pacific Northwest there is an average annual precipitation of approximately 100 inches along the Cascade Range, while in California the precipitation is very much less.

Owing to topographical and physical conditions, the Pacific Coast section naturally divides itself into several entirely distinct territories or zones. At the north end is the Puget Sound country, extending from Olympia on the south to the Canadian line on the north, a distance of approximately one hundred and seventy-five miles, all bordering on Puget Sound, and including the cities of Seattle, Tacoma, Everett, Bellingham and Olympia. To the south, and inland one hundred and twenty miles from the ocean, bordering the Willamette River, a few miles above the confluence with the Columbia, is Portland and the immensely rich land adjacent to it on the south, which supports several good sized cities. Farther south, still west of the mountains but yet not bordering on the ocean, is the famous Rogue River Valley, and to the south of this in California is the Sacramento Valley extending down to Sacramento. Beyond is the immense territory adjacent to San Francisco, and the San Joaquin Valley to the south. Cut off entirely from this section is the region in and around Los Angeles.

Economic reasons require that each of these sections be treated as a separate entity, and be supplied with its various public utilities, independent of the other communities. At first these various sections were entirely separated from one another, but as time elapsed, connecting railways were found to be a necessity, and today they are well served in this respect. The distance between the different localities, however, prohibited their being served as a whole by any one public utility, and hence the present situation.

The Puget Sound country is served by the Puget Sound Traction, Light & Power Company, whose total installation is 107,907 horsepower, of which 73,667 horsepower is produced by water power plants and 34,240 horsepower by steam plants. The total capitalization is approximately $71,000,000. The Portland Railway, Light & Power Company supplies the territory from Portland to Salem, Oregon. Its total installation is 81,907 horsepower and its total capitalization is approximately $60,000,000. The California Oregon Power Company operates in the Rogue River Valley in Oregon, and in the northern part of California, with a total installation of approximately 20,000 horsepower. The Pacific Gas & Electric Company supplies all of central California, its total installation being 233,900 horsepower, of which 123,700 horsepower is generated by hydro-electric plants. The Southern California Edison Company supplies Los Angeles and vicinity and has a total installation of 119,800 horsepower, of which only 42,500 horsepower is generated by water. In California there are also a number of companies which supply power in large quantities to distributing companies. Among these are the Great Western and the Northern California Power Companies with plant capacities of approximately 90,000 and 50,000 horsepower; and the Pacific Power & Light Corporation with 156,000 horsepower of which 80,000 horsepower is hydro-electric. In addition to these companies there are others which supply both light and power to the smaller communities.

Across the western barricade of mountains from the immense territory just described, and reaching back inland to the East are numerous fertile areas, some well populated, others more sparsely settled, which are supplied by various operating companies. The territory in and around Spokane, Washington, is served by the Washington Water Power Company, whose total capacity is 108,250 horsepower, of which 89,250 horsepower is water power. The basin of the Columbia River, and the country extending east to the limits of the State of Washington, is supplied by the Pacific Power & Light Company, with a total installed capacity of 22,100 horsepower. Central Oregon is so thinly populated that no large operating company has attempted to supply it. In California, Truckee, and also the neighboring section of the western part of the State of Nevada, is covered by The Truckee River General Electric Company. Further south, the Southern Sierra Power Company supplies, from its various plants on Bishop Creek, the adjoining territory in California, and its transmission lines extend to various mining communities and into the Imperial Valley district. The Company has one of the longest transmission lines in the world.

The growth of the Pacific Coast States is so well known that not more than passing mention need be made of it. In the ten years from 1900 to 1910, the remarkably increasing demand for electric power could not be met by the operating companies. The earlier types of construction for the water power plants are not the recognized standard of construction at the present day, but at that time they fulfilled the purpose admirably, with exceptions that are now well known. Lack of storage facilities was one of the common causes of inability to supply the constantly increasing demand for electric power. This was overcome, in some measure, by the construction of steam auxiliary plants, to tide over the peak period. The later hydro-electric developments

which have been made, have ample storage facilities which will obviate, to a great extent, the necessity of these steam relays; particularly is this true where more than one water power plant feeds into a transmission line. With only one such plant, the steam relay is needed to guarantee continuity of service; but, with several water plants, it is not so essential. In some cases, the expensive steam auxiliary plants provided in the early stages of development are now practically a dead investment so far as present revenue producing capacity is concerned; as a measure, however, of guaranteed continuity of service they are worth the money invested. The northern portion of the Pacific Coast differs very materially from the southern portion in this respect. On many of the streams in the southern portion the run-off is not sufficiently large to provide storage of any size, while on others prior appropriation of water for irrigation or for mining purposes prevents storage of any magnitude. In the northern part, however, these conditions do not exist. The run-off in the streams, owing to the fact that the precipitation is very heavy, is much greater.

As stated above, up to 1910 the operating companies had much difficulty in obtaining capacity needed for the demand upon their plants. Since that time conditions have changed to a certain extent; the markets have become more nearly saturated with power, and there has not been the demand that existed prior to that time. Forecast curves made as late as 1909 and 1910 by various operating companies showed an average annual increment that seemed to prove that much greater capacities would be needed in the next few years. It is not possible for a public utility company to wait until the demand exists for power before constructing its plant, but it is necessary for it to look ahead a few years, estimate, as closely as possible, the power that will be required, and anticipate the demand. Following this procedure, the various companies provided additional capacities and made arrangements for new plants to take care of the load which they expected to have in the succeeding years. The forecast curves did not follow their upward trend, but flattened out, and practically all of the companies on the Coast now find that they have a surplus of power. This condition is not so marked with the companies in California, for the reason that new uses have been found for power which cannot be found in the Pacific Northwest. Pumping water for irrigation, dredging, and similar purposes in California has served to consume a large amount of power, which at the time the plants were constructed was not counted upon. So far as the Pacific Northwest is concerned, the three large operating companies find themselves with an excess in their present operating plants of from thirteen thousand to twenty-five or thirty thousand horsepower. If the capacities of their steam plants are included, their surplus power ranges from thirty-five to forty thousand horsepower, up to as much as fifty and sixty thousand horsepower.

As a result of this condition the largest operating company in the Northwest has attempted by means of a very aggressive compaign, to interest manufacturers in other parts of the country in locations in the Pacific Northwest. The result has been rather gratifying. An endeavor of this kind is entirely new to the power companies, and the results will be noted with interest. In line with all the other public utility corporations operating in this country, the Pacific Coast companies are endeavoring at all times to build up the communities which they serve, realizing that upon these communities depends the success or failure of their particular enterprises. The amount of new capital needed for electrical development in California, Washington and Oregon in the next ten years is estimated at anywhere from $150,000,000 to $250,000,000, depending largely upon the number of new industries that can be brought to this section.

In practically all of the Coast cities the value of the manufactured products is less than in a majority of cities of smaller size in the eastern part of the country. With a rapidly increasing population, with the opening of the Panama Canal, and with the opening of Alaska, it is believed that this condition will be changed. Local conditions will have to be taken into consideration before any prediction can be made as to the extent to which the Coast will become a manufacturing centre. The four vital elements for industrial pre-eminence are: a market for the product manufactured, transportation, labor, and raw materials, and, to a lesser extent, the cost of power. The location of the industry naturally depends to a great extent upon the article manufactured. It is believed that the predominance of raw materials in the Pacific Northwest, the extremely cheap power which can be had there, the splendid transportation facilities offered both by rail and water to all points along the Pacific Coast, as well as to eastern points, will have much to do in influencing large concerns to locate west of the Cascade Mountains.

Statistics show that today one-fourth of the entire generating capacity of the United States is used by one-seventeenth of the country's population in the West, and that this same population is contributing one-seventh of the aggregate income of the electric lighting industry. On an average, every person in the West uses five hundred and twenty-seven kilowatt hours annually, and pays $7.50 for light and power, as compared with the ninety-nine kilowatt hours consumption, and the $3.00 contribution east of the Rockies.

California ranks second to New York State in the amount of water power development, there being a total of 432,300 horsepower in water wheels installed; (it also ranks third in total capacity of dynamos, having 817,000 horsepower installed). Washington, with an installation of 269,640 horsepower in water wheels, ranks third, while Oregon, with a total water wheel development of 105,300 horsepower, also ranks high among the states as a producer of electric power.

RIVERS AND HARBORS OF THE PACIFIC COAST OF THE UNITED STATES.

Brig. Gen. W. H. Bixby, U. S. A., Retired.
Formerly Chief of Engineers.

The present extent and the possible future development of the rivers and harbors of the Pacific Coast of the United States can not be fully appreciated without comparison of those of the Eastern United States and of foreign countries.

The useful water area of the State of Washington is closely that of the States of Virginia and Maryland. The American half of the Juan de Fuca Strait (whose length is about 80 miles, average width about 14 miles, average depth several hundred feet, with few outlying dangers) taken in connection with its southward prolongation, Admiralty Inlet and Puget Sound (together about 82 miles long, 7 to 1 miles wide—average about 2 miles—great depths as a rule up to within half a mile of the shore or to within reach of modern wharf construction) and the adjoining waters of Washington Sound, on the northeast, and Hood Canal, on the southwest, constitute a single waterway, almost equal in area to Chesapeake Bay, and far surpassing it in deep water anchorage and deep water frontage. Such being the case, with their large area of fast-developing back country and their direct connection to four trans-continental railway lines, Tacoma and Seattle, and even Everett and Bellingham, have possibilities greater than those of Baltimore and Norfolk of today. The Columbia River valley is over a thousand miles in length; and its basin, or drainage area, involving about two-thirds of the States of Washington, Oregon, and Idaho, is larger than the valley of the Danube west of the Iron Gates, or than the Ohio River valley. The Sacramento and San Joaquin valleys, forming a single continuous valley tributary to San Francisco Bay, form an area greater than the valley of the Rhine or the Rhone, and practically equal to that of the Elbe or the Vistula.

In past years, especially prior to 1900, the water borne commerce, and the river and harbor developments, of the Pacific Coast (except at San Francisco) have been comparatively slight, due rather to sparseness of population than to lack of harbors or harbor depths. At present, the Pacific Coast is increasing rapidly in population, and with this increase has come the natural demand for better water transportation facilities, and the ability to provide them.

The experience of the Atlantic Coast and Europe indicates that the success of a harbor or water terminal depends greatly upon its accessibility to and from all its transportation lines, both water and land, at inexpensive rates for transfers between them, and that this condition can rarely be secured except through public control of some sort. It is already known (see House Doc. 492, 60th U. S. Congress, 1st Session) that once loaded into 21ft. draft boats on the Great Lakes, or into 9-ft. draft boats on rivers like the Ohio, heavy bulk cargoes can be transported by water at a cost of less than $.005 per ton mile, a rate which is much lower than rates by rail; but this saving may easily be wiped out by the high transfer rates of poorly arranged, or monopolized, terminals. Within the past few years, the legislatures of California, Oregon, and Washington have passed acts allowing municipalities and other public bodies to own, or to control, the harbor areas, piers, wharves, docks and adjacent properties, and to issue bonds to secure the funds necessary for proper development of harbors. Realizing further that the chief benefits from such developments are usually local, and that direct federal help must be limited in amount, and be merely supplemental to local expenditures, the larger municipalities (and some smaller ones) of the Pacific Coast are contributing liberally to harbor development work, and the counties and states are lending aid in the same, or other equally material, ways.

San Diego, which has complete ownership of several miles of harbor front and several hundred acres of tide lands adjacent thereto, is already spending, under the guidance of expert harbor engineers, $1,000,000 in commencing the construction of modern terminals for 35 feet draft vessels. The actual depth over the ocean bar is already 30 feet at low water and 35 feet at high water, with an additional 5 feet being dredged by the federal government. The municipal wharves are to be provided with modern loading and unloading devices, and the dockage, wharfage and handling charges at all wharves receiving mixed or general cargoes are regulated by the Board of Harbor Commissioners.

Los Angeles, in like manner, although without complete ownership, is spending $10,000,000 (over half of which has already been voted) upon accommodations for vessels of 35 feet draft. Its existing draft is 30 feet at low water (an increase to 35 has been recommended by federal officials) up to 16,000 linear feet of wharf frontage, over 2,600 of which belongs to the city, and a less draft up to about 14,000 more wharfage. The municipal ownership is about one-sixth of the present total wharf frontage, and the charges at all wharves are controlled, as at San Diego. At San Francisco harbor, the State owns about ten miles of water frontage, of which it has improved about 4.75 miles with about 10 miles of wharves—exclusive of bulkheads. Moreover, along the entire improved water front of the city of San Francisco, the State controls a public street between the water and the private property with riparian rights. By popular vote of 1904 and 1910 the State is now spending $12,000,000 upon port improvements, all of which, together with operation of existing State wharves and of the State Belt Railroad, are under the direction and control of the State Harbor Commission of San Francisco; all being based upon the existing 48 feet depth at low tide on the best ocean bar, and 4 feet tidal range.

Portland, Ore., within the past two years has voted $2,500,000 for municipal wharves, and Portland and Astoria have together voted $500,000 for channel dredging in the Columbia River, this being in addition to liberal former contributions for similar dredging by the Port of Portland; all being based upon an actual 26.5 feet depth at low water on the ocean bar and in the river. The federal project, two-thirds completed, is for 40 feet on the ocean bar, at a total cost of about $18,000,000.

Seattle and King county in 1912-13 voted $6,300,000 for port improvements to accommodate vessels of 30 feet draft at low water, a much greater draft being possible at comparatively slight expense whenever demanded by Pacific vessels.

Tacoma, Yaquima, Tillamook, Nehalem, and other lesser municipalities along the seacoast are following these examples, so far as local circumstances will allow.

The Pacific Coast is already reasonably supplied with dry docks, stone and floating, and marine railways, for vessel repairs. At San Diego, there is a marine railway of 50 feet length, 50 feet beam, 11.5 feet draft, and 1,000 tons capacity. At Long Beach, adjoining San Pedro, a floating dock of 284 feet length, 76 feet beam, 21 feet draft over keel blocks, and 3,000 tons capacity. At San Francisco, besides the accommodations at the U. S. Naval Station at Mare's Island, there are 4 marine railways of 4,000, or less, tons capacity; 3 floating docks of 2,500, or less, tons capacity; and 2 stone docks, the largest (Union Iron Works) having 730 feet bottom length, 74 feet bottom breadth, and 30 feet draft over sills. At Portland, Ore., 5 marine railways and 2 floating docks, the largest (municipal) having 468 feet length, 82 feet inside breadth, 25 feet draft over keel blocks and 10,000 tons capacity. At Aberdeen, Grays Harbor, a marine railway of 1,500 tons capacity. At Seattle, 3 marine railways of 3,000, or less, tons capacity, and 4 floating docks, the largest (Seattle Construction & Dry Dock Co.) having 468 feet length, 110 feet inside width, 31 feet depth over keel blocks, and 12.000 tons capacity. At Bremerton, the Puget Sound U. S. Naval Establishment, there are 2 stone docks, available to the public when not in use by the federal government, of which the largest has 573 feet length on blocks, 93 feet entrance width, and 28.5 draft over its blocks. At Winslow, Eagle Harbor, there is a marine railway (Hall Bros.) of 325 feet length, 85 feet width, 17-21 feet draft over blocks, and 4,000 tons capacity. At Everett, another marine railway of 1,500 tons. And at Esquimalt, Victoria, and Vancouver, British Columbia, there are 6 marine railways of 3,000, or less, tonnage capacity, and 1 government stone dock of 450 feet length, 65 feet width of gate, 45 feet bottom width and 27-29 feet draft over sills. In connection with the above docks and railways, shipbuilding operations are carried on at San Francisco, at Portland, and at Grays Harbor, Eagle Harbor, and Seattle. Oil docks for general supply purposes exist at San Diego, San Pedro, Redondo Beach, Monterey, San Francisco, Oleum, Stockton and Sacramento, at Astoria and Portland, and at Seattle. Coal docks for supply in large quantities exist at San Francisco, Portland, Tacoma, and Seattle.

As regards existing commerce, the ports of the Pacific Coast are already doing well considering their youth and surroundings. In 1913 (as stated in the An. Report Chief of Engineers U. S. Army, 1914) the total water commerce, exports and imports, foreign and coastwise, reached the following values at the larger ports: At Tacoma, $36,000,000,—greater than that of Toledo, Ohio; at Seattle about $115,000,000,—about the same as that of Portland, Me., or Providence, R. I., and more than half that of Baltimore or Buffalo; (the foreign commerce of Puget Sound alone equaling about $114,000,000, or about one-half that of Boston); at Astoria and Portland, Ore. (mouth of Columbia River), $102,000,000,—greater than either Cleveland, O.; Mobile, Ala., or Charleston, S. C.; at San Francisco, $540,000,000 (of which $183,000,000 was foreign), surpassed in the United States, in both total and foreign commerce, only by New York City, Boston, Norfolk and Galveston, and in total commerce alone by Philadelphia; at Los Angeles, $94,000,000, greater than Cleveland, Mobile, or Charleston, S. C.; and at San Diego, $55,000,000, practically equal to Tampa, Fla., and only a little less than Mobile, Ala., and Jacksonville, Fla.

In this connection, it is well to bear in mind the rapidity with which all Pacific Coast water-borne commerce is increasing; for example, San Francisco foreign commerce alone increased 33 per cent in the eight years from 1905 to 1913 (of which 20 per cent was in 1912-1913), and Puget Sound foreign commerce alone increased in like manner 50 per cent in the same eight years (of

which 12 per cent was in the single year 1912-1913).

In available depths, Seattle, Tacoma, and Puget Sound water fronts in general are equal to those of any parts of the Atlantic coast of America, and better than those of Antwerp, Belgium; Naples or Brindisi, Italy; Dieppe or Havre, France; Bremerhaven or Hamburg, Germany. Grays Harbor (21 feet on its bar at low water) and Willapa Harbor (27 feet on bar) north of the Columbia River, and Tillamook Bay (10 feet on bar), Yaquina (12 feet on bar), Sinslaw (7 feet on bar), Umpqua (13 feet on bar), Coos Bay (14 feet on bar), Humboldt Harbor (18 feet on bar), between the Columbia and San Francisco, while not yet fully developed, have natural endowments sufficient in time to enable them to rival Charleston, S. C., or Portland, Me., (the shifting and dangerous bars are being improved under projects and appropriations made by the federal government). From the Ocean to Portland, Ore., the Columbia River is, in depth, equal or superior to the harbors of Portland (Me.), Norfolk, Charleston (S. C.), Jacksonville or Pensacola. Astoria and Portland, which bear to the rich and extensive Columbia River basin the same geographical relations that Rotterdam and Cologne bear to the Rhine basin, have depths and areas of good waterways, accessible back country, and trans-continental railway connections sufficient to bring them a population and commerce equal to that of the European cities. San Francisco Harbor (all of San Francisco Bay) with its 36 square miles of anchorage area with depths of 40 to 90 feet, and 200 or more square miles of lesser depths, is already in depths equal to New York Harbor or any other Atlantic or Gulf port of the United States; and in future possibilities it is the equal of any of them. Los Angeles has an available bar and harbor depth equalled by no United States port except New York. San Diego Harbor, with its completely land-locked, half-tide water area of 21 square miles, and its existing inside draft of 21 feet at low water over 9 miles in length, will, when dredging now in progress is completed, have a bar and harbor depth exceeded on the Atlantic coast only by New York, and its commerce should now increase with great rapidity.

The Columbia, Sacramento, and San Joaquin rivers have large drainage basins and permit of extensive navigation. The Columbia is valuable for water power and irrigation as well in its middle portions as in its upper portion. The Sacramento and San Joaquin are specially valuable for irrigation purposes in their middle portion. The Columbia river, and its tributaries, by the end of 1915 when the 9-mile, 8-feet depth canal is completed at Celilo, will be navigable from its mouth upward for 114 miles (to Portland) with 26 feet draft, 200 miles with 8 feet draft, 400 miles with 4 feet draft, and over 500 miles with 2 feet draft, into the interior of Oregon, Washington, and Idaho. The Sacramento is already navigable over 100 miles with 7 feet (to Sacramento), and over 300 miles with 2 feet (to Red Bluff). The San Joaquin is already navigable 45 miles with 7 feet (to Stockton); and the San Joaquin and Mokelumne 88 miles with 8 feet (to Galt-New Hope). So far as these rivers are navigable they are valuable adjuncts to the harbors into which they enter, and the communities served thereby are naturally much interested in the general river and harbor developments to which they are thus affiliated. Aside from these three, Pacific Coast rivers are comparatively small, and their navigable lengths are mainly restricted to the portions affected by the tides of the harbors which they enter. All of them however have valuable water powers at or near their head-waters.

BREAKWATER AT SAN PEDRO—PORT OF LOS ANGELES.

The opening of the Panama Canal will necessarily add considerable impetus to further development of the Pacific Coast Harbors. With the increased business will come the need for more wharves and improved terminal facilities, such as are already being started at San Diego, Los Angeles, San Francisco, Portland, and in Puget Sound, under municipal ownership or supervision.

Full details of past development of individual harbors, and present rules and directions for use of pilots and other navigators of the Coast or its harbors, are published by the War Department (Annual Reports, Chief of Engineers, U. S. Army) and of the Department of Commerce and Labor—now the Department of Commerce —(U. S. Coast Pilot—Pacific Coast, 1909, with annual supplements).

SIPHON ON LOS ANGELES AQUEDUCT. BUILT BY THE CITY. DEADMAN'S CANYON.

PACIFIC COAST SECURITIES.

By G. K. Weeks.

The following article, prepared before the cataclysm in Europe temporarily deranged all security markets, undertakes to deal with normal conditions as they have existed. A discussion of the qualities of investment bonds which are common to these securities in all markets is not considered within its scope. Rather will it be the purpose to outline as clearly as may be those conditions governing the issuance of securities or features of the market therefor which have been characteristic of the Pacific Coast.

The leading characteristics of the Pacific Coast States which have influenced the issuance and sale of securities are probably the rapid growth of this territory in population and production; the need of outside capital; the exceptional climate, which attracts people accustomed to the luxuries of life; and the original and independent habits of thought which are typical of the sons of pioneers who form the backbone of the population of this section.

The last federal census showed a percentage of increase in population during the 1900-1910 decade as compared with the beginning of that decade amounting in California to 60.09%, in Oregon, to 62.68%, and in the State of Washington to 120.41%, as compared with only 21.02% for the United States as a whole. While the most rapid growth was in the cities, the rural districts also showed marked increases in population and wealth. Of the eleven counties in California where the population increased over 75% between 1900 and 1910, only two contained cities having a population of 50,000 or more. These increases are all the more striking as compared with the small growth or declines in the population of rural districts in the East and Middle West. Such rapid growth points to a necessity on the part of states, municipalities and public utility corporations alike of raising large amounts of capital for providing the facilities necessary for the adequate public service of these communities.

There are at present evidences of some discrimination against Pacific Coast Municipal Bonds, on the ground that these municipalities are putting out "too many bonds." That there is some justice in this criticism the writer would be the last one to deny. However, from 1890 to 1910, Seattle grew in population from 42,837 to 237,194; Oakland from 48,682 to 150,174; Los Angeles from 50,395 to 319,198, and the confident utterances of the various Chambers of Commerce are to the effect that the ratio of growth reflected in the above federal census figures has been more than maintained during the last four years. In contrast, we find that among Eastern cities of similar rank, between 1890 and 1910 Cincinnati increased in population only from 296,908 to 363,591; Buffalo from 255,664 to 423,715; Washington from 230,392 to 331,069, and New Orleans from 242,039 to 339,075. This rapid Western growth requires continuous expenditures for new schools, new public buildings, new sewers, new fire protection systems, and, alas, new jails. Also, if the municipality operates its own water system, new capital is constantly required for its enlargement, particularly in "Sunny California," with her dry seasons, where domestic water in many cases is brought at heavy expense from the distant mountains.

Likewise, in undertaking the financing of healthy public utilities on the Pacific Coast, it must be realized that success can only be attained by the expenditure of large sums of money year after year to provide necessary increases in plant and equipment, and that if these sums are not supplied, companies cannot give satisfactory service to consumers in their territory and cannot prosper. An illustration of financing illy suited to conditions in this territory is furnished by a traction system in California on which there were placed in the short space of eight and one-half years five successive bond issues, being in turn, first, second, third, fourth, and fifth mortgages on the bulk of the system, all because the authorized amount of these various issues was insufficient to provide for the growth of the sys-

tem for even a moderate period of time. The history of the Pacific Gas & Electric Company, the largest and best known utility on the Pacific Coast, illustrates the growth for which a utility in this territory must be prepared to provide. This company practically doubled the number of its consumers in the six and one-half years ending June 30, 1914, the increase being from 183,271 to 359,228, without extending into any new territory of importance. Our first proposition thus is, that the legitimate financing of the Pacific Coast States involves the continued issuance and sale of large amounts of new securities so long as the present ratio of growth continues.

The demand for outside capital follows naturally, although not necessarily, the rapid growth already outlined. In this matter conditions in the three Coast States have been by no means identical. In California, during a long period terminating about 1906, local capital seemed sufficient for all requirements. Except for the money brought into the State by the transcontinental railroads, financed in the East, and by Eastern settlers, neither the municipalities nor the corporations went outside their own state for funds. Since the bonanza days of '49, the output of the State's mines had been enormous, the fertile valleys had rendered ready tribute to the agriculturist, and the shipping of the State's chief port, San Francisco, had added not a little to the general wealth. At the beginning of the year 1906 the total of California State and Municipal Bonds held in the East was less than $5,000,000, an amount now frequently exceeded by the shipments during a three months' period. The public utilities of the State were practically all financed at home. The San Francisco earthquake and fire of 1906 resulted in a tremendous demand for capital for the rebuilding of homes, stores, office buildings and factories. About the same time the subdivision of the great interior ranches, and their irrigation or reclamation to make them suitable for intensive farming, received a great impetus; interurban railroad building began in earnest; the hydro-electric industry, which had sprung into being half-a-dozen years before, underwent rapid development; and the State came to be one of the greatest petroleum-producing sections in the world. From being self-sufficient in her financial affairs, California has now come to be a very large borrower of Eastern and foreign capital. In Oregon development has been less rapid. Portland is the most conservative city on the Pacific Coast. The East is constantly buying securities in moderate volume for the financing of Oregon municipalities, utilities and timber enterprises, but the development of the State has not gone forward with the feverish haste that has characterized California during recent years. Washington has been developed almost entirely by Eastern money, a goodly portion of it coming from New England, and while the forests and grainfields of the State are bringing in increasingly large returns and the Alaskan trade is proving a source of great revenue, municipalities and corporations alike still turn to the Atlantic Seaboard for practically their entire supply of new capital.

The effect of the climate and the wealth it attracts is to be noted in the $18,000,000 issue of California State Highway Bonds now in process of being marketed, supplemented by county bond issues throughout California aggregating an additional $12,500,000 for permanent road-building, which have been sold during the last six years. California owns more automobiles per capital than any other state in the country, which probably accounts in some degree for the passion for good roads. Santa Barbara and San Diego are reputed to enjoy an exceptionally equable climate, and have attracted a large number of wealthy Eastern residents. Santa Barbara, in order to assure herself a permanent supply of pure water has tunneled a mountain, tapping a natural reservoir. San Diego, a comparatively small city, has sold during the last five years approximately $6,100,000 bonds for the acquisition and development of a domestic water system, and $4,000,000 additional for parks, schools and other municipal improvements.

The effect of the pioneer spirit already referred to is to be found in part in the confident crowding into a few short years of the development and improvements which have occupied practically as many decades in most Eastern communities,—in part in the slashing way in which Pacific Coast communities frequently go about remedying abuses. If because of improper financing or for other reasons a street railway system fails to give proper service, or to provide the extensions required by the growth of a community, the vigorous Western mind jumps at the solution of municipal ownership, sometimes, it seems, with very little consideration, minding not at all that the careful economist who has worked out these movements to their final conclusion may advise that the latter state will be worse than the first. While it is unwise to dogmatize on matters of this kind, it is the writer's judgment that the population on the Pacific Coast contains no greater socialistic element—probably less—than the population of the Eastern states, and that the considerable vogue of municipal ownership is due not to any theoretical conversion to the wisdom of state ownership and operation of utilities, but rather to an ungovernable determination that the facilities which are believed by the local population to be befitting their ambitious cities, shall be immediately achieved—if private capital does not respond with alacrity, then by the municipality itself.

A detailed discussion of the exact market for the various classes of Pacific Coast bonds would be too technical for the purposes of this article. The state bonds and bonds of the cities of Spokane, Seattle, Portland, San Francisco, Oakland, and Los Angeles, which alone of the Pacific Coast public issues are legal investments for savings banks in New York and Massachusetts, naturally find their market largely in the East. In the case of none of the municipalities in question are more than 50% of outstanding bonds held on the Pacific Coast, and in the case

of some of them practically the entire outstanding indebtedness is held outside the home market. The situation as regards county bonds is somewhat mixed. Many of these issues find their way to the Eastern market, but in California, where county bonds are favored for trust fund investment, even above the bonds of the largest municipalities, the local market absorbs a very fair proportion of county issues. Of all California county bonds outstanding, a majority are today held within the State. In all of the three Pacific Coast states, local municipal bonds are accepted as security for public deposits; in California they are the only legal security. The demand for public bonds for this purpose reinforces the demand for savings bank or trust fund investment to a marked degree, in addition to which the state school funds in California and Washington absorb a very considerable amount of local bonds, so that outside of the very high-grade municipals which are legal for savings banks or sought after for insurance company investment in the East, the local market absorbs the bulk of new municipal issues.

In the public utility field the movement toward consolidation, so well known in all sections of the country, has gone forward in a rather rapid way. In the State of Washington practically all public utilities of importance fall within five or six groups, all controlled from the East. The situation in Oregon is similar. In California many of the important interurban railways are under the control of the Southern Pacific Company. In the hydro-electric field eight companies practically dominate this industry throughout the State. These companies are mostly controlled in California, but represent the investment of a large amount of Eastern capital. In the case of bonds issued, the proportion placed in the East is usually in direct ratio to the size and importance of the issue, the more important bond issues which come on the market in large blocks being taken principally by Eastern and foreign capital, while the smaller companies putting out bonds in limited amounts from time to time are able to obtain their capital to a large extent in the local market.

The railroad commissions of the Pacific Coast states, and particularly the California Commission, bid fair to become large factors in the market for public utility securities which come under their jurisdiction. The California Commission has adopted the broad principal that no securities, either stock or bonds, may be issued except against an investment in property in an amount fairly comparable to the part value of the securities issued. While a strict adherence to this rule may work some initial hardship in the matter of stock issues, it is believed by the writer that its conscientious application to the securities of companies operating in a territory which possesses such great natural resources and such brilliant prospects of future growth as the Pacific Coast states, will insure a class of public utility bonds as safe and ultimately as popular as those originating in any other section of the United States.

MINING ON THE PACIFIC COAST.

By H. Foster Bain, Editor Mining & Scientific Press, San Francisco.

Time is bringing changes in mining along the Pacific Coast. Only in Alaska and Oregon do the gold mines now make the largest contribution to the annual output. In California, petroleum, the wonderful liquid fuel that is transforming the industrial situation on the West coast, now outranks it; while in Washington coal takes first place and even in British Columbia, that province of marvelously varied mineral wealth, coal outranks not only gold but copper, which there takes second place.

Using for convenience the more complete figures for 1912, and following the statistics compiled by the United States Geological Survey, it appears that the mineral output of the three Pacific Coast states is now as follows:

California	$92,837,374
Washington	15,347,313
Oregon	2,553,549
	$110,738,236

To this may be added the production of Alaska and British Columbia, $22,724,833 and $32,440,800 respectively, making a total of $165,903,869. The present production is at an even larger rate. The total is impressive even in these days of large sums. What is even more significant, however, is the large portion of the total which represents fuels and structural materials; the former accounts for $58,322,376, and the latter for $26,276,879. Of these the expenditure on structural materials—including clay products, stone, cement, and lime—represents money spent at home largely in building up permanent structures. In a sense, it stands for savings of the present for the future. The fuel, too, is largely consumed at home. While California is exporting large quantities of petroleum, the bulk of the oil is burned on the West coast and each barrel of oil or ton of coal represents work done by unseen hands; labor that does not eat and does not consume. The waterfalls, oilwells, and coal mines make up in part for the small population in the large area.

Ninety per cent of the mineral output of the Pacific Coast is represented by four items:

Fuel	$58,322,376
Gold	43,416,335
Structural materials	26,276,879
Copper	19,373,233

The remainder of the production is in widely varied form. California is the most important North American producer of quicksilver, and Alaska has the only important tin mine. Silver and lead are not mined in important quantities on the Pacific Coast, though in eastern British Columbia there is a thriving industry and in the Coeur D'Alenes, barely outside the state of Washington, is one of the world's great lead-silver districts. Almost all the metals and non-metallic minerals of economic importance occur in the region and many of them are produced. It is not likely, however, that within any period of

present importance the dominance of fuels, gold, copper, and building materials will be challenged.

While the days of gold easily won from shallow placers have gone, gold mining is still a great industry and it is now based upon deposits that assure it a long life. The dredging fields, it is true will be exhausted in a few years by the great 16-cubic foot buckets used on modern boats, but the quartz mines grow in importance rather than the reverse. The reason is that each new device, each increase in scale of operations, so lowers the cost of production as automatically to convert into ore much that was previously too lean to rank as more than waste. When mining began at Juneau, small veins of quartz containing gold to the value of $20 per ton or more were worked, just as even richer veins have been, within a few years, opened near Sitka. Such veins are quickly exhausted, but the Alaska-Juneau is now preparing to mine ore worth but $1.35 per ton net, and is counting on treating 12,000 tons per day. On this basis the supply is considered adequate for 300 years. Two neighboring mines are likewise arranging for wholesale production. While the opportunities are exceptional at Juneau, and for some time to come it will be impossible to hope for equally low costs elsewhere, movement in the same direction is taking place in all the mining districts on the coast. There can be no such thing as total exhaustion of the mines, even though a mine is a true wasting asset. As the demand for metal grows, any resulting scarcity is reflected in price, which in turn, with better or larger scale operations reducing costs, brings into the field deposits previously unworkable.

The great new thing in the Pacific Coast mineral industry in the last decade has been the opening of the California oil fields. It is difficult to overestimate the importance of this development in an area relatively barren of fuel. Nowadays not only does California supply more crude petroleum than any field in the world, but its reserve is the largest known; more than half the total for the United States. It is believed that the California oil fields have now been outlined and that there is comparatively little hope of finding any great productive area outside their limits. While, too, it is hazardous to guess, it is not thought probable that any comparable fields will be discovered upon the Pacific Coast of North America. The reserve, therefore, while large when measured in barrels is small as measured against future demands if oil is to continue to be burned for fuel in all the industries and territory now dominated by it. For the present coal is at a discount on the Pacific, but, measured by long years, the petroleum supply is entirely inadequate. Even now, and with the Mexican and other Gulf coast fields to reinforce the supply, the Atlantic steamship companies dare not convert their ships to oil burners. It is inevitable that in a comparatively few years the demand for petroleum will outrun the cheap supply and its use will be restricted. For the present it is abundant and so cheap that the producer makes little or not profit. The benefit goes to the transporting and marketing agencies in part, but most of all to the people of California and neighboring states who, by reason of the possession of this marvelously efficient and convenient fuel, have seen industries established and brought to a profitable basis in a few years that would otherwise have had to wait for decades.

Time will continue to work changes in the mining industry of the coast. Petroleum will become a precious fuel to be used only for special purposes. Coal mining in the Northwest and Alaska will grow; improvements in smelting practice will permit the copper industry, now held down by court restrictions on fume emission, to take its proper place; iron and the minor metals will play their part; the output of structural materials will increase with the population; and always the West will furnish, not only the minerals called for by industry, but an appreciable amount of gold as a basis for the currency with which the business of industry may be transacted.

A GOLD DREDGER.

HARVEST TIME IN THE INLAND EMPIRE.

THE AGRICULTURE OF THE PACIFIC COAST.

By Thomas H. Means, of Symmes, Means & Chandler.

Less than one hundred years ago the agricultural products of the Pacific Coast country consisted of a few cattle raised under the direction of the mission fathers, and of the yields from small orchards, gardens, and grain fields surrounding the mission settlements. The country back from the Coast and away from the missions was a wilderness inhabited by Indians. Within this hundred years a population of seven millions has come into the district west of the Rocky Mountains; five millions occupying the immediate coast states. The mines first attracted settlement, but agricultural development has gone on so rapidly that today mining is but a small part of the interests of the people. Agriculture has become the great industry, and, though the area of land developed is small as compared with the total area, there are large areas of the highest type of agricultural development. One hundred years has seen a change from wilderness to the most scientific and highly specialized farming in the world.

This settlement and development of so vast a territory is one of the most remarkable events in the history of the world. While the time given above is one hundred years, the real substantial progress has occurred within sixty years. Within that time the five millions of people who occupy the Pacific Coast states have established 200,000 farms containing 51 million acres, of which 22 million acres are improved. The value of crops raised in 1909 was $345,000,000, and the value of live stock on farms $360,000,000.

A development carried on at such a rapid rate must meet and solve many important problems, and it is natural to suppose that many problems of importance are yet awaiting solution. Taking everything into consideration, however, the development of agriculture in some parts of this territory, is superior to that of any similar area in the world.

The Pacific Coast region is divided, agriculturally, into five great districts, each of which has agricultural possibilities peculiar to itself. These are:

1. Rocky Mountain Slopes.
2. Great Basin.
3. Sierra Nevada Valleys.
4. Interior Valleys of California and Oregon.
5. Coastal Regions of California, Oregon and Washington.

These five topographic regions merge somewhat, but are, in their broad lines, distinct. Each has its crops, its transportation and marketing problems, and each will develop in the future along lines more or less independent of the others.

The Rocky Mountain Region.

The Rocky Mountain Region of the Pacific Coast includes that part of Montana, Idaho, Wyoming, Utah, Colorado and New Mexico draining into, and commercially tributary to, the Pacific Coast. The area includes the mountain slopes and elevated valleys of the states mentioned. A great variety of climates, soils and agricultural possibilities are present.

Owing to the distance of the region from large cities and from cheap transportation, the agricultural development of an intensive character is confined to small areas around centers of mining activity, and to districts along the transcontinental railroads and their branch lines.

Grain, hay, cattle and sheep are the principal products, but the growing of potatoes for shipment and fruit of a superior quality has been developed on a considerable scale at many points. The upper Snake River Valley in Idaho, and the country around Grand Junction, Colo., are examples.

Irrigation is necessary in all of these higher valleys. The country can be said to be only opened up, and its possibilities demonstrated, by these developments; the future will see many undeveloped areas brought into a high state of cultivation. Very few localities now have a large area of high class development, but as transportation facilities and population increase larger areas will be improved, and we may expect to see a continued and healthy growth on these regions.

A great area in which irrigation cannot be carried on will, on account of its roughness, doubtless be devoted in the future, as it has been in the past, to grazing. The valleys will be devoted to the production of grain and hay for maintaining and fattening the cattle grazed on the mountains and hills. The local markets in mining camps and cities along the railroads will be supplied with produce, and a surplus of high grade fruit, and such commodities as potatoes will be shipped out.

Freight rates from this mountain region to the markets of the world will always act to prevent the shipping of bulky commodities. The produce will probably be shipped out as meat, wool, or other animal products. The high quality of the potatoes, fruit and canned goods is such that there will always be an outside market for them, and Colorado, Utah and Montana potatoes and apples are likely to be in demand.

This region will benefit as little as any from the Panama Canal, except as the opening of the canal will cause great development on the Pacific Coast. The canal will not make the world's markets more available to Rocky Mountain agriculturists.

The Great Basin.

The great basin is that county between the Rocky and Sierra Nevada mountains, and includes parts of Idaho, Washington, Oregon, Utah, Nevada, Arizona, and Eastern California. The region is elevated in Southern Idaho and Nevada, the valleys averaging over 4,000 feet above sea level, but is lower at the north and south ends. In Washington the elevation is generally less than 2,500 feet, and in Southern Arizona less than 3,000 feet. The rainfall varies greatly, from less than 5 inches per annum in parts of Southern California, Arizona, and Nevada, to 25 inches in Washington. Temperatures vary in a similar manner and, while oranges are grown in the south, there are mountain ranges covered with perpetual snow.

Irrigation is necessary in most parts of the great basin region. The only portions where farming without irrigation is possible are certain parts of Northern Idaho, Oregon, and Washington. A few districts are humid enough to permit of dry farming in parts of Utah, Nevada, and Arizona.

The irrigated valleys present highly cultivated and prosperous districts, as is seen in Southern Idaho, and in Utah and Arizona. Much of the land, however, has no available water supply and is used for pasturage alone. Hundreds of square miles are sheep and cattle range, and will always remain so.

The soils of the great basin vary greatly, but there are larger areas of soil derived from volcanic material. Washington, Idaho, and Nevada are regions of lava ash and lava soil. Where rainfall or irrigation water is available, the crops produced are excellent and regular.

The crops of the great basin are varied, oranges in the south; fruit in Utah and in the north; potatoes in Idaho; and alfalfa, grains, and cattle in all parts. Fruits and vegetables are but a small part of the total produce, but in some districts they become an important item of production. For instance, in certain parts of southern Idaho fruits are important, and potatoes of a high quality are produced. Oranges and grape-fruit, very early in bearing, are grown in Arizona, and there is promise of considerable extension of this business. In Utah, where farms are small and labor abundant, fruits and vegetables are grown for canning and shipping.

Grain and cattle products are, however, the most important items which go into general commerce. The grain-growing regions of Oregon and Washington now produce fifty million bushels of wheat yearly and are capable of producing more. The other parts of the region do not now produce much more grain than needed for local consumption.

Cattle and cattle products are everywhere important, and in aggregate these are the most important items of agricultural produce entering the channels of commerce. The wide areas of semi-arid land, too dry for farming, afford considerable feed, and cattle and sheep produced under range conditions are fattened for slaughter in the irrigated valleys, or shipped to other feed-producing regions. The opportunities for the future lie in the direction of increasing the number and quality of the cattle and sheep raised.

High freight rates will always work against the great basin country and hold down the shipping of bulky produce. It is true that, in special districts, fruit and vegetables of a high quality will always be produced and, on account of their superior quality, will be shipped long distances, but in the long run sheep, cattle, and their products, will be the staples and the money makers for the farmer.

The new lines of commerce introduced by the opening of the Panama Canal will have considerable effect upon the great basin region. Freight rates at tide water are low enough to enable these regions to ship into the world's markets, and it is likely that canned foods, potatoes, fruits and grain, as well as animal products, will be shipped.

The Sierra Nevada Region.

The district designated the Sierra Nevada Region includes the mountain zone from Mexico to Canada which lies between the great basin on the east, and the Interior Valleys of California and Oregon on the west. The width of this great mountain belt varies from fifty to one hundred miles. It includes a large area of fertile valley and hill land, but a great area is too rough for anything but grazing or forestry.

Much of the area is now occupied by National Forests, and by forest land in private ownership The lower mountain slopes are well suited to fruit culture, and the valleys for production of all kinds of produce suited to the climate. The east slope is much drier than the west slope and much smaller in area, for the distance between the mountain crest and the great basin region is short. To the west the slope is gradual, and the area of land suited for agriculture is large.

Very little of this region is now farmed. Much of it is grazed by cattle and sheep, and it is only where the transcontinental railroads cross the range that the area of farmed land is large. Such a farming area is found along the Southern Pacific Railroad from Sacramento to Reno.

Large areas of land of great potentiality are found in all three states traversed by this great mountain range and it is likely that future generations will see much of this now undeveloped

HOPS IN THE SACRAMENTO VALLEY, CAL.

land cultivated, irrigated and producing crops. Fruit and fruit products will be the greatest item in production, but cattle and animal products will be important on account of the area of land which is too high and too rough for anything but pasturage.

The Interior Valleys of California and Oregon.

The Interior Valleys of California and Oregon lie between the Sierra Nevada Mountains and the Coast Range. The San Joaquin and Sacramento Valleys in California, and the Willamette Valley in Oregon are the most important regions.

These valleys are warm in summer, with very mild winters; have large areas of excellent soil, and quantities of water for irrigation; are surrounded by mountains rich in minerals and oil, with tremendous quantities of water power developed and awaiting development. Deep water transportation is available in both valleys, and rail transportation is well developed.

The products are varied, almost every crop grown in the United States, with the exception of a few strictly tropical plants, is grown here, and there are such varieties of soils and situations that some spot may be found where each crop can be produced commercially. There is no region in America where a greater variety of products may be found. Grain has long been the staple crop, but as irrigation is developed, grain gives way to horticulture, dairying, gardening, sugar beets and hops. Cotton, tobacco, and rice have been grown on a small scale, and the near future will see these rapidly extended. Cattle and sheep summer in the surrounding mountains, and winter in the valleys. Hops, barley, and vines furnish the stimulants for the nation and there is the opportunity for great extension of these crops when temperance instead of prohibition becomes the rule in the United States.

These valleys are, in many places, highly developed, and support confortably a large population in a small area. Such regions as those around Fresno and Modesto in California have considerable areas where a family is comfortably supported by the produce from ten or twenty acres, and there are, in California and Oregon, several million acres capable of equally high development. The great valleys of California and Oregon could support five million people in comfort.

The nearness of these valleys to tidewater is an important factor in their favor. Tidewater enters the lower part of the valleys in both cases. Steam roads and electric lines are being constantly developed to transport produce to the cities and to tide water.

The products of these valleys already enter extensively into the world's commerce. California grain, wines, and dried fruits, and Oregon hops, are shipped to Europe in direct competition with European grown produce.

These valleys have a variety of soils, and conditions which permit regular and heavy crops to be produced. The climate is dry and the sunshine strong in summer, making the harvesting of crops sure and the quality good.

As yet, water transportation, though available, has had a small part in the development of these valleys. The greater part of the higher valued produce goes east by rail, but grain, hops, dried fruits, and wines are sent to Europe and the Atlantic coast by water. The Panama Canal will open the way for more extensive shipments of these commodities, and it is likely that vessels equipped for refrigeration will permit shipment, by the canal route, of oranges, grapes, apples, and other fruits now shipped by rail.

Coastal Regions, California, Washington and Oregon.

The coastal regions of California, Washington, and Oregon include that portion of the coast which derives its climate directly from the Pacific Ocean, where the temperatures are generally low, there is little frost, and more rain than in the interior valley.

In southern California, the rainfall varies from 12 to 15 inches. Northward there is a gradual increase until, in Washington and Oregon, the fall is from 100 to 120 inches. There is a corresponding gradual change in crop possibilities, and in native vegetation. In southern California, the land is scarcely timbered at all, and the agricultural products are largely of a sub-tropical nature. In central and northern California, grain, beans, alfalfa, truck, and dairying are the rule. In the north, dairying is the greatest industry.

These coast regions have a climate which is regarded as superior to any of the interior climates, and for that reason are apt to fill up with a large population. We have today an example of this dense population in southern California. Almost the entire orange belt lies in the coastal region. A similar condition prevails in many of the smaller valleys which open out on the Pacific Ocean, such as the Salinas Valley, and the valleys at each end of the San Francisco Bay. The portions of this region in north California, Oregon, and Washington, are now only partially developed, but we may expect a large influx of settlers who will farm the valleys and clear the low mountains and foot hills for the planting of fruit. This region will be largely farmed for the purpose of supplying the coast cities; comparatively few products will be grown for shipping or export. There are important exceptions, however. The citrus fruits of southern California are one of the State's largest export crops, and important fruit centers have been developed in a number of other valleys, such as the Pajaro and Santa Clara valleys, south of San Francisco. Other important centers of fruit growing will later be developed in the north.

These fruits will be shipped to eastern markets by rail or the Panama Canal.

The Agricultural Problems of the Pacific Coast.

The statements above outlined briefly review the physical conditions of each of the important districts of the Pacific Coast, and call attention to the products which these districts grow for shipment. It is easy to see that the development of the Pacific Coast is yet in its infancy, and while no portion of the United States has had more rapid development or greater increase in population in the last twenty-five years, it is equally true that in the near future we may expect a much greater advance. There are certain problems, however, which must, sooner or later, be settled by the people who come into these regions.

The first problem, on the settlement of which will depend the future of the country, is that of markets for produce. The second problem, which has been seriously considered in many regions of the west, is that of the supply of agricultural labor. The third problem is that of securing settlers for much of the land which now lies idle, or which is held in large tracts.

The Markets for Pacific Coast Products. The markets for Pacific Coast products are today well developed, but a large increase in the production of any one crop would cause disaster. For instance, the orange business has been developed from a small beginning to shipments exceeding 40,000 carloads per annum. It happens that Florida is now increasing products of citrus fruits to a great extent, and any further increase in the production of the Pacific Coast will have to meet Florida competition, or seek a market elsewhere. Again, the apple industry of Washington and Oregon has been developed faster than regular markets for the produce have been secured, and there are now years when fruit brings low prices. These low prices are, without doubt, largely due to competition from districts nearer the point of consumption. Until the people of the Pacific Coast have developed and secured a permanent market for their fruit, they will always have this fluctuation in prices. It is thought that the Panama Canal will open new channels of trade and thus enable the people of the Pacific Coast to overcome these difficulties by shipment of their products over a wider area.

The fruit business is, however, by no means the only agricultural industry which has problems of marketing. The grain crops are generally sold without difficulty, but there are times when the hay crop exceeds the demand and prices are low. At present this is due to the scarcity of feeding cattle for the consumption of hay, high prices for beef having recently caused large numbers of young animals to be sold. It will naturally come about that the herds of the west will be built up, though this is going to be difficult as long as young cattle continue high in price, but once the industry is re-established, there should be a smaller fluctuation in hay prices. The time will rapidly come when the small farmer who has a few acres of hay will produce a few animals for slaughter and, by thus creating a market for his own forage crops, be independent of the general market prices for such produce.

The Labor Problem. Many of the industries of the Pacific Coast are highly specialized and a large amount of labor is, each year, required for short periods; for example, the fruit picking and hop picking seasons. The hay harvest, which extends over a longer period than in the east, also requires considerable

extra labor and coincides with the busy season in the mountain lumber camps. The consequence is that there are often periods when labor is scarce in parts of the west, and the farmer has to put up with very inferior help, despite the fact that prices for agricultural labor in the west are higher than in the eastern states.

This condition will slowly right itself as the large holdings are cut up. An increase in the number of small farms results in a large amount of labor being brought into the country. The women and children will be able to do much in the way of fruit and hop picking, leaving the men free for the hay and grain harvests. It is furthermore expected that cheap passenger rates will be established via the Panama Canal bringing immigrants from European countries, who will naturally drift to the farms, and much healthier labor conditions will be the result. It is not likely that much of this labor will come supplied with capital sufficient to enable them to buy farms, but, wherever government lands are available, they will settle on them and secure their living, while developing their own farms, by working on adjoining places. It is unfortunate that public sentiment on the coast is now so strongly unfavorable to certain classes of Oriental labor, for no other people have been able to give us the services required at such a low rate of pay.

The Settlement of the West. The settlement of the west has only begun. It will easily be possible to support a population five times as great as that now found there. Climatic conditions are favorable; health conditions are good; the splendid class of pioneers who settled the west have built up social and political institutions which are attractive to thinking people. All of these together are serving to interest people the world over in the Pacific Coast. Now that the Government has undertaken the development of the irrigation resources of the country, and has settled upon a fixed policy regarding other natural resources, this population is bound to come, and come to stay.

It is unfortunate that the real development of the west has been made a business of money making on too large a scale. The sale of land at high prices has been the one great motive which is back of practically all settlement in the west. The rise in land values has been extraordinary and to-day, in California, Washington, Oregon, and other states of the west, land is offered to settlers at prices ten times its value a few years ago. It is claimed that the prices now being asked are justified by the return that the lands will give, but, whether this is true or not, high prices are discouraging settlers, and the west is suffering in consequence. However, operators are beginning to realize their mistakes, and are taking steps to rectify them, as elsewhere cited in this volume.

Natural conditions on the Pacific Coast have made possible a remarkably rapid development of that territory in the last sixty years. Its future development, to which the Panama Canal will contribute, will be even more rapid. The present tendency is toward development of a constantly more intensive character. This, together with an ever broadening market for its products will result in greater prosperity.

ALL READY TO PICK APPLES IN OREGON.

INTENSIVE FARMING ON A LARGE SCALE

By S. F. B. Morse

The farming industry has not, until within a few years, been regarded with favor by the large investor. Bad seasons, lack of rain, or too much rain have rendered the return uncertain and the interest item has been considered hazardous when directly dependent upon crops; although the fact that principal invested in the industry has been deemed sufficiently secured is evidenced by the enormous aggregate loaned on farm mortgage by such large investors as the Insurance companies.

That this general attitude on the part of capital has been successfully defied is illustrated by the great fortunes built up in earlier days by the "wheat kings" and other large operators of the Pacific Coast.

Tractor and 24 disc plows cutting a 16-foot furrow in dry sod land and covering over 4 acres per hour.

These men were, almost without exception, "one crop" men. In spite of the large average return that their operations showed, floods, droughts, or other causes of crop damage or failure occasioned them heavy periodic losses—sometimes through a series of years. This fact did not tend to change the attitude of capital toward large single investments in the farming industry.

The first primitive experiments in irrigation in California quickly served to demonstrate the economic error of such operations. The case of the "wheat kings" was analogous to that of Mark Twain's pseudo prince "Tom Canty," who used the Great Seal of England "to crack nuts with." They were raising seventeen bushels of wheat per year, less deductions for losses and fallow years, on an acre of land which, with the additional investment required for irrigation would, in seven years, yield annually one ton of olives, and in ten years, two tons. Investors were quick to see the obvious and the conversion of great grain farmed tracts to diversified farming under irrigation has since been steadily carried on.

As the subject of irrigation is separately treated in another article it is the writer's intention to describe here only such of its phases as bear directly on the subject in hand.

Irrigation greatly reduces the uncertainty of farming and, owing to the fact that the Pacific Coast has a wet and a dry season, the danger of injury to crops by summer rains is practically eliminated. It has been the general opinion that irrigated farming, which is of necessity intensive, must be limited to the small farmer, the average size of an irrigated farm in California being twenty acres. The difference between the earning power per acre of dry farmed or grain land, and that of irrigated land, was so wide that the majority of large investment in agricultural projects up to the present time has been along the lines of acquiring tracts of arid land, developing irrigation, and offering the land for sale to small farmers or, as they are commonly called, colonists.

The most inexpensively developed irrigation project is one where the land is adjacent to a stream, the flow of which is constant enough to furnish sufficient water for irrigating, and where there are no difficult engineering features involved in diverting the water from the stream onto the land. Projects of this type were, of course, the first to be developed. Those who were able to acquire large tracts of land so located, at a price based upon its value when grain farmed, realized enormous profits from its sale in twenty acre tracts under irrigation. The success of the early investors gave such an impetus to the business of developing large irrigation tracts that, at the present time, there remains no arid land capable of simple irrigation, save at a price based upon its possible earning power when irrigated rather than on its present earnings. Furthermore, all of the inexpensively developed river waters which can be used for direct irrigation have been appropriated. The future irrigation supply must be had by means of expensive storage or pumping stations.

Of land and water available by such methods there is still abundant supply. Great as has been the influx of settlers, particularly to California, it is a fact that of the fourteen millions of acres susceptible to intensive cultivation in the San Joaquin and Sacramento Valleys alone, there are less than three

million acres actually irrigated and settled. There is very little agricultural land in the entire state that cannot be supplied with sufficient water for irrigation by one of the two methods above mentioned. All of the streams of the semi-arid west have tremendous flood discharges in the winter and spring caused by winter rains and melting snows in the mountains. These flood discharges are, for the most part, unused, as they seldom occur during the irrigating season. It has been estimated that the flood discharges of the streams emptying into the San Joaquin and Sacramento rivers are, if stored, of sufficient volume to irrigate every acre of agricutural land in the valleys; and that sufficient practical storage sites exist to hold these flood waters.

The San Joaquin and Sacramento valleys are the agricultural backbone of California and, as Southern California is already in a high state of development, they will be the field for the greatest development in the future.

In an article recently published by the Modesto Chamber of Commerce, certain statistics for the year 1912 were quoted showing that in the Modesto Irrigation District the average value per acre of all products grown amounted to $137.16. After deducting 50% of the gross as the necessary cost of caring for the land harvesting crops, water charges, etc., the net production amounts to 6% on a valuation of $1,143 per acre. Despite the showing made by these figures a number of the largest agricultural projects on the coast have met with severe reverses in the last two years and are now in difficulties and process of re-adjustment.

Caterpillar tractor with two-furrow ditching plow building irrigation ditch and levee at the same time.

The failure of nearly every one of these projects has been due to a mistake in policy or to bad management rather than to any intrinsic fault in the physical property, such as poor land or insufficient water. The increased cost of land and of water, and the large overhead expense entailed by present methods of subdividing and selling, together with the development of a supply of small irrigated tracts actually exceeding the demand and the resulting competition between the selling companies, have reduced the chances of financial success for such companies to a minimum. Competition has been so keen that great extremes have been resorted to in connection with the selling of such small irrigated tracts. Many companies maintain extensive offices with a number of branches throughout the country, pay large commissions, and indulge in extravagantly expensive and badly planned advertising campaigns. Nearly all are compelled to allow the purchaser several years in which to pay for his property.

The *basic error* in the methods that have been employed is the fact that the developing companies have depended entirely upon the sales of land, not only for the ultimate return of their initial investment, but also for the payment of interest, overhead charges, and their profits. Hard times, over supply, or any one of a number of possible conditions that hinder their ability to make sales, may force the companies to offer their properties in small parcels at far below their real value, in a vain attempt to meet fixed and current charges. *Yet these companies have made no expenditures in the actual farming of the land.*

The majority of the colonists came to the coast from abroad or from the middle west. In most cases they are unfamiliar with local conditions and with irrigation, and have only enough money to make a reasonable payment on their land and equip themselves to start farming. Generally the colonist is dependent upon the immediate success of his operations for his living and for the funds required to defray the deferred payments on his land, which, as a rule, consist of five equal annual payments, with interest on balances at the rate of 7% per annum. Even if the land he purchases is excellent, the climatic conditions good, and the water supply adequate, his success, under this handicap, is problematical; yet upon his success hangs that of the company from whom he buys if they are depending entirely upon the sale of their lands to meet their financial requirements.

If the colonist fails, not only does the land revert to the seller but the reputation of the entire project suffers, making future sales increasingly difficult.

In view of these facts it is strange that the large investor, in casting about for a more substantial financial plan, has neither contemplated nor investigated the possibilities of intensive farming on a large scale as the logical solution of his problems in meeting carrying charges and overhead expense; the items which have been the primary cause of so many failures. If the small farmer with limited means and narrow viewpoint can, in un-numbered instances, make a success of such farming on a small scale, the business man with adequate capital, scientific management, and labor saving devices, can make an even greater success on a large scale. *Broad, axiomatic business principles pertain to this industry as well as to any other, if applied with equal intelligence.*

Farming projects so handled under able management give the investor a high rate of return and permit of his holding developed lands for higher prices and disposing of the property in accordance with the natural laws of supply and demand at an ultimately greater profit. Likewise, when fully developed lands, from which the colonists can be assured of an immediate return, are sold on the partial payment plan, the security to the seller is much greater for the unpaid portions of the purchase price. In the Modesto district above mentioned, land may be purchased at $125 yielding a 6% return on a valuation of $1,143. It is obvious that the large investor, purchasing land in large tracts at much less than this retail price, and developing his own water supply, is presented with greater possibilities in the develop-

ment and operation of the land than in the re-sale in small parcels at prevailing values.

There are certain crops for irrigated areas that are particulaly suited to farming on a large scale. Perhaps the most important of these is alfalfa, which is, of course, a staple. It is *the* forage crop of the southwest, being paritcularly valuable in the feeding of all types of work stock and dairy cows, and in fattening cattle, hogs or sheep. It is the most common crop grown by the twenty or forty acre farmer.

There are other crops that it is practical to grow on a large scale under irrigation; the olive, for which there is a constantly increasing demand, an especially hardy tree bearing for practically an unlimited length of time; the fig, of which much the same can be said; the sugar beet; the onion; the potato (all being among the hardier types of roots). Within the last year or two cotton has been proved to be a profitable crop in certain sections of California. In fact, an eminent authority states that there is no crop grown in the United States which cannot be grown to advantage in California, under irrigation. It is simply a question of the selection of the crop best suited to the land, which can be handled to advantage on a large scale.

The developer of an irrigation project which is to be operated on a large scale has a distinct advantage in that he can so prepare his land as to make irrigation adequate and inexpensive, and provide for proper drainage.

A tractor pulling a battery of scrapers. Grading and leveling land ready for water.

Under a district, or co-operative plan, the small farmer must be satisfied with a restricted quantity of water, available only at certain intervals, and he ordinarily meets with a serious problem in drainage, owing to the fact that his excess water must either remain on his own land, or, in discharging, prove an injury to his neighbor. Of course, in certain districts, such difficulties have been largely obviated, but the fact remains that a large tract operated by one management can be made to yield a return much greater than the same number of acres cut up into small tracts under several hundred individuals.

Even if it is the ultimate intention to dispose of the tract in small parcels, it is the course of wisdom to develop all, or a large portion, of it for immediate operation, to provide for interest and overhead expenses. The project thus developed is independent of any of the causes of adverse selling conditions. The chance of failure of either seller or buyer is reduced to a minimum. It is along such lines that the irrigation project of the future must be handled in order to obtain for the investor the surest and highest return.

There have recently been some projects that have been handled exactly along the lines above outlined. In most instances with which the writer is familiar, the operating returns have been so much greater than was anticipated that it has been deemed inadvisable to market any of the property in small tracts at current prices. A fair example of the advantage of intensive farming on a large scale has come to the observation of the writer in the case of a company holding a tract of nearly seventy thousand acres in the San Joaquin Valley in California. Interesting comparisons are available between its operations and those of the adjoining farmers of small tracts. This company has ample financial backing and owns one of the old holdings of the state, to which it has added from time to time as occasion demanded. From grain farming the company has progressed, step by step, through various phases of operating as experience and conditions have dictated changes. It was one of the first to develop a large irrigation system, yet for years did little farming on its own account, depending entirely upon the subdivision and sale of its property in small parcels for its revenue, disposing of several thousand acres in this manner. Later it did small development in the line of producing alfalfa, gradually working into the business on a larger scale.The company now has nearly three thousand acres in a single tract of alfalfa and intends to increase this to ten thousand acres. A direct comparison of the methods and results obtained by the colonists on the one hand and the company on the other are available. The company has taken units of three thousand acres and first platted these lands in twenty acre tracts, then surveyed an irrigation system and a drainage in such a manner as to make each unit a block of perfectly drained and irrigated twenty acre farms. The purpose of first subdividing the land has been to make it possible, should conditions warrant, to dispose of the property in small blocks in the shape of developed and producing farms. But the work is done in such a manner as not to handicap in any way the ease and economy of operating the property as a whole. The use of tractors and heavy disc gang plows has made it possible for the company to do better, more rapid, and more economical work than can be done by the colonist with small horse-drawn implements. The company has also developed a special type of leveler designed for use with a tractor which reduces the cost of leveling to one-half of what it is when done with horse drawn Fresno scrapers; the only available method for the small farmer. By the employment of these methods the company is independent of unskilled labor. There is but a small and extremely undependable floating supply of such labor in California and it is the cause of one of the most serious problems facing the ordinary developer. On the developed portions of the company's alfalfa fields certain crops are cut and cured. The cuttings are, for the most part, chopped, and blown by machinery into large storage feed sheds for the winter feeding of beef cattle. The food value of chopped alfalfa hay is much higher than that of unchopped hay. Other crops are allowed to mature on the ground and are pastured off by beef steers being fattened for market.

At first all of the company's fattened cattle were sold on the hoof to large packing establishments. Later, realizing that neighboring communities could be easily supplied with dressed beef, the company installed its own abattoir and cold storage plant which was made large enough to handle much of the live stock produced by small local operators in addition to the entire product of the company's own ranch. Having recently added to their holdings large tracts of grange lands on which cattle are raised to be alfalfa-fattened for killing, this product is considerable. So successful has the company been with its dressed beef operations that it now contemplates the purchase of a chain of retail butcher shops. Many of the neighboring colonists, on the other hand, are not in a position to consume the alfalfa that they produce but are obliged to haul it to market and dispose of it subject to variations in price. It so happens that in the season of 1914 there has been a large supply of alfalfa hay and small farmers are receiving a low price. On the other hand, while hay is cheap, beef is high and the company, which is marketing its alfalfa in the form of dressed beef, is receiving a handsome price and making a large profit with much less cost of handling. Many of the colonists are fattening beef on a small scale; many are raising and feeding hogs on alfalfa; and many are operating dairies. Here again the large operator has a distinct advantage. The company has control of the dressed meat market over a considerable extent of local territory and is independent of the middle man, whereas the colonist is not. In fact the company is in the position of making the middleman's profit on the product of the colonist, a large portion of which the company handles, as well as saving that profit on its own product. In addition to these obvious items there are many ways in which this company, on account of the size of its holdings and the magnitude of its operations, effects minor economies which, in the aggregate, amount to a considerable percentage. For instance, the company breeds, raises, and breaks all of the work stock for its own use and some for market. The company maintains a machine shop of considerable size and not only makes all necessary repairs to its machinery and equipment but also manufactures new parts, thus effecting the saving of a considerable item. The company is in a position where it is making a very liberal return on a valuation approximately double the price at which it disposed of its other holdings to colonists, plus the cost of development. It is able, when it desires, to dispose of its improved holdings to demonstrate its earning power and can afford to be liberal in the terms of payment allowed the purchaser because of the certain knowledge that the property is fully and properly developed and is now producing at a rate sufficient to insure the success of purchasers under ordinary conditions. As a matter of fact, its success in intensive farming under irrigation on a large scale has been so great that it is not now offering, and cannot afford to sell, any of its irrigable lands at present prices. The facts regarding this company strikingly illustrate the possibilities of this method of handling large projects.

The field for investment in this line is tremendous and the profits to be realized by the project properly handled are large and sure. The three requisites to certain success are these:

Proper examination prior to the purchase of the land, taking into consideration soil, climate, water supply, and transportation available.

Intelligent planning of crops with a view to what is best suited to the particular soil and general market conditions.

Efficient management, insuring a maximum output at a minimum cost.

Intensive farming on a large scale offers a most attractive field for investment and its possibilities loom large in the realm of big business.

Tractor and scarifier working in an orchard to help the rapid growth of trees.

THE OIL INDUSTRY OF CALIFORNIA.

By Frank J. Silsbee.

The beginning of the twentieth century marked the dawn of the era of oil power in industrial and maritime pursuits the world over. Before its span of years is half passed there will have been witnessed the most phenomenal revolution in all history of mechanical engineering through the utilization of oil as a source of energy in place of coal and other combustibles used for steam-making and other power-production purposes. The development of the internal combustion engine, capable of being operated with crude petroleum and low-grade distillates, and suited to the requirements of the world's work on land and sea, will work a marvelous change in engineering standards. No mechanical achievement has made such rapid strides and none has been more revolutionary in effect. Oil power is in the ascendency.

The petroleum industry of California is of great importance to the industrial and commercial pursuits of the Pacific coast, on account of the economic change in production and transportation costs being brought about by the development of oil power. The oil resources of the Golden State are destined to have a world-wide influence on industry and commerce. The economic advantages of liquid fuel on land and sea will attract the manufacturer, and, with the Panama Canal, influence the routing of the world's shipping.

Petroleum is the natural fuel of the Pacific coast states of North and South America. This territory has no coal deposits of particular commercial importance. Aside from deposits in Washington and British Columbia, and the undeveloped resources of Alaska and Peru, there is no satisfactory coal. The coal that is produced does not compare favorably with eastern, Welsh, or Australian coals, and the cost is considerably higher. The use of California oil is therefore universal on all railroads in the state and its consumption extends into Arizona, New Mexico, Nevada, Oregon and Washington, British Columbia and Alaska. In short, the market comprehends a territory from Alaska to Chile and Hawaii, and inland as far east as Carlin, Nevada, El Paso, Texas and Albuquerque, New Mexico. Almost all coastwise steamers burn oil, and when the economic influence of liquid fuel with the internal combustion engine begins to be felt, the use of oil will extend to the trans-oceanic vessels.

The advantages enjoyed in the use of liquid fuel in stationary plants may be summed up briefly as follows:

1. General cleanliness.
2. High boiler and furnace efficiency.
3. Ability to carry overloads and meet, almost instantly, wide ranges in load.
4. Total absence of smoke when burners are properly handled.
5. Uniform draft and air supply, giving minimum variation in furnace temperature.
6. No loss when stored indefinitely.
7. Low cost of handling.

The advantages of oil being burned under marine boilers instead of coal are enumerated as follows:

1. Ability to raise steam quickly.
2. Rapid bunkering from lighter or shore, day or night, rain or shine, with no dust or dirt.
3. Can be stored in double bottoms and in other spaces on board ship where coal could not be placed.
4. Practically double steaming radius for given storage space.
5. No spontaneous combustion; decreased boiler room force; hardships of stoking removed; absence of dust and dirt in the engine room with the consequent reduction of wear on working parts.
6. No ashes to handle; and decreased maintenance cost through increased life of boilers. etc.

For railroad purposes the use of liquid fuel, aside from affording many of the benefits given in the foregoing, has the further advantage of the absence of sparks, thereby eliminating the danger of fires along rights-of-way. In certain forest reserves through which railroads pass, the government requires that oil be burned, to reduce the fire hazard.

For metallurgical purposes, fuel oil gives an increased capacity to the furnaces, high temperatures, absence of soot in dust chambers, ease and range of regulation, and ability to reduce "sows" quickly.

The average price for which good steaming coal can be delivered into bunkers of consumers in Pacific coast territory is close to $8 per ton. Records of the Navy Department from 1906 to 1910 indicate that the average price the federal government paid for coal for its war vessels on the Pacific was $8.10 per ton. The average in the Puget Sound country was $8.18 and Mare Island $8.47 per ton. It will therefore be seen that $8 per ton is a fair basis of coal cost in comparison with liquid fuel. Exhaustive tests by the United States government, and other independent investigations, indicate that from three to three and one-half barrels of oil fuel are equivalent to one ton of good steaming coal. The average price which the consumer of California fuel oil has had to pay for supplies during the past decade is probably less than $1 per barrel; for the purpose of comparison, however, that figure will be used. On the basis of three and one-half barrels of oil as the equivalent of one ton of good steaming coal, the per-coal-ton-cost of oil figures $3.50. The saving in favor of oil, therefore, is $4.50.

To illustrate how this works out, take the case of the Southern Pacific railroad system, the greatest single beneficiary of oil fuel. It uses approximately a million and a quarter barrels per month. The cost of this oil to the railroad is probably close to 75c per barrel, or $2.75 for the combustible equivalent to one ton of coal. If coal were used, approximately 357,143 tons would be required to do the work done by oil. At $8 per ton this coal would cost $2,857,144.

Figuring oil at 75c per barrel, the cost for fuel would be $937,500, representing a saving of $1,919,644 per month, or approximately, $24,000,000 a year. It might be well to point out, at this juncture, the economy of oil transportation on railroads. Fuel oil equivalent to one ton of coal weighs 1,139 pounds. One of the ordinary tank cars in use on the railroads will hold 297 barrels of oil, which is equal to 85 tons of coal. It is thus seen that two forty-ton coal cars would be required to transport the fuel equivalent of one tank car of oil. The saving in equipment and transportation costs is readily apparent.

A gas company in Los Angeles uses approximately 60,000 barrels of oil fuel per month. Assume that the average cost per barrel is $1, though in fact, this company has long bought fuel below 75c per barrel. The total monthly bill for oil fuel would therefore be $60,000. Sixty thousand barrels of oil is equivalent to 17,143 tons of coal, which figured at $8 per ton, would require an outlay of $137,144, compared to $60,000 for oil; a monthly saving of $77,144. Thus the comparisons may be brought down to the smallest consumer, whose saving is proportionate to the amount of oil used. It can readily be seen what a boon oil fuel is to the small user, particularly on account of its ease in handling, storage, etc.

Interesting and remarkable as these facts are in connection with the use of oil as fuel, they sink into comparative insignificance, in the light of the economies of the heavy oil internal combustion engine for land or sea power. Burning oil under boilers must be characterized as criminally wasteful when compared to the new engine.

A description of this engine, which is commonly referred to as the Diesel, taken from a paper prepared in 1912 by Rudolph Diesel, the inventor, is as follows:

"The Diesel engine suffers neither ignition nor carburetion troubles for the same reason that a snake is not troubled with gout. The oil engine does not depend on any sparking device, as does the gasoline engine, nor any red-hot ball, as does the kerosene engine. The Diesel compresses pure air into its cylinders, not an explosive mixture of gas and air. The air is compressed to a degree which raises its temperature far above the burning point of oil. Pre-ignition would occur, as in gasoline engines, were it not for the fact that there is nothing to ignite until the piston has finished its upward stroke and is ready to descend.

Just at this instant a tiny spurt of oil is injected into the hot compressed air, where it ignites. The result is what the average person would call an explosion. In reality it is not an explosion such as occurs in the gasoline engine, where a mixture of gas and oil is fired. The burning of the oil occupies almost the whole time during which the piston is descending. The result is a steady push like steam, instead of the violent blow of a gas explosion."

The United States Bureau of Mines, in Technical Paper No. 37, has published some interesting facts in connection with some of the advantages of the internal combustion engine over steam and other prime movers. It deals particularly with the engine as adapted for marine propulsion, showing such economies and efficiency in its use, as will attract the attention of the world's merchant marine. Reduced to simple terms, one barrel of oil used in the marine internal combustion engine, is equivalent to three or four barrels burned under a boiler. The oil engine requires less men than a steam engine of equal power. It is cleaner, and much easier for the men to handle. No fireroom is necessary. No stokers are required and consequently there is no need of quarters for them. The engine dispenses with boilers. It requires no smokestacks — only a small exhaust stack—and no ventilating fans are needed in the stokehold. It develops no smoke whatever. When the engine is running properly, no exhaust is visible. The total weight of the engine is about the same as that of a reciprocating steam engine, not including the boilers and condensers. No fresh water is required; salt water can be used for cooling the cylinders. The engine room is thirty to fifty per cent smaller than that of the steam engine of equal power and more easily kept clean and in order. The thermal efficiency of the internal combustion engine, or heavy oil engine, as it is sometimes called, under full load is thirty per cent, compared to twelve per cent under steam units. Such engines are in use in many types of vessels, ranging from small pleasure vessels to those of ten to twelve thousand tons displacement, and larger ones are constantly being built.

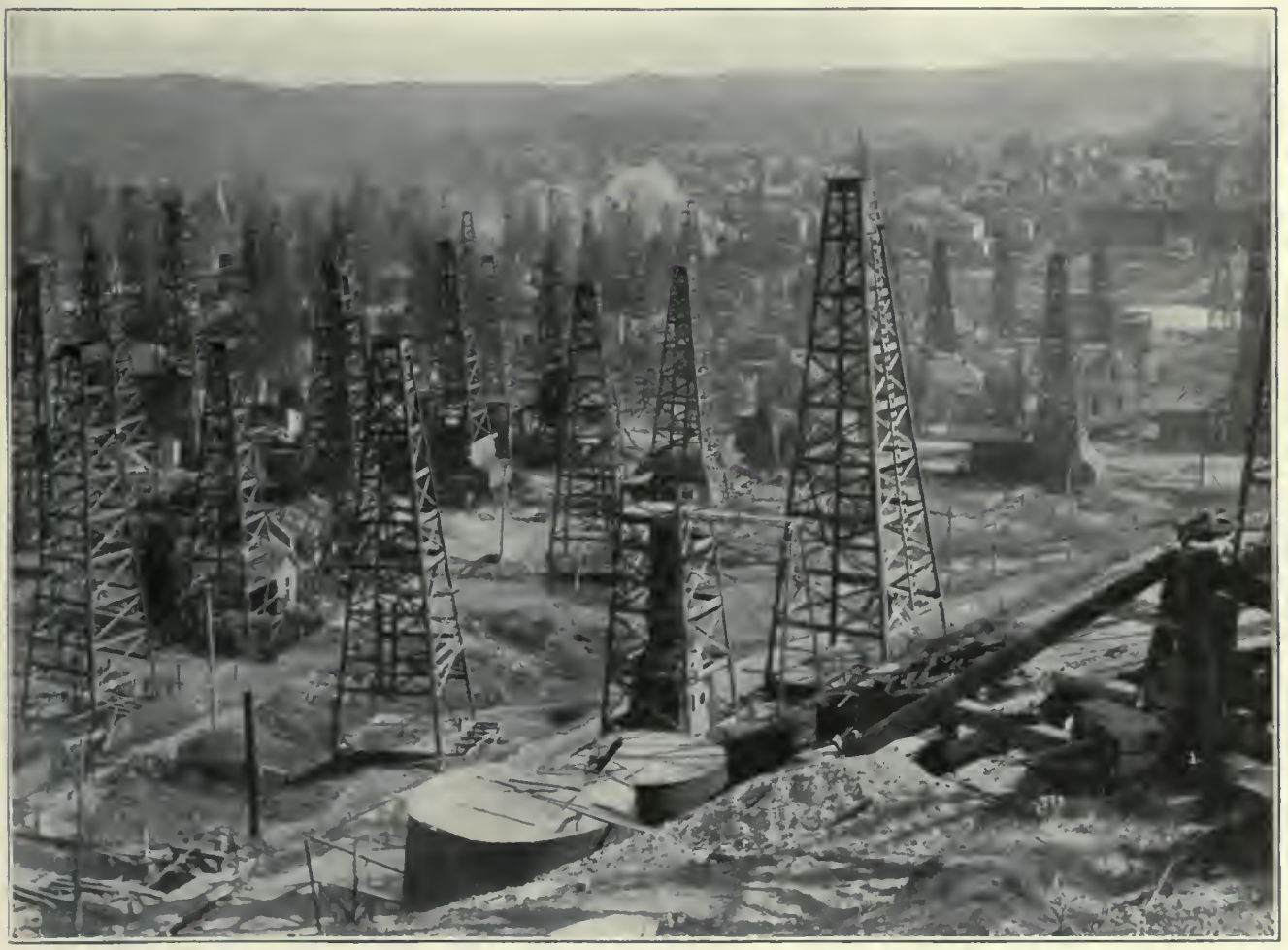
A ship of this type visited California ports recently. Comparing two vessels of equal displacement, one a motor-ship and the other a steamer, it is stated that the motor-ship will carry 10,000 tons of pay freight as against 8,000 tons by the steamer, at 50 per cent of the fuel cost per ton carried and with a ship's crew of half the size. The motor-ship can travel one and one-quarter times the circumference of the globe without replenishing fuel tanks, whereas a steamer could go no more than a quarter of the distance without coaling. Marine engineers state that, even though the first motor-ships built have cost more than steamers, there is no real reason why the new type of sea transport should not ultimately be built and fully equipped for nearly the same price per ton as a high grade quadruple-expansion-engined steamship, provided the size is at least 10,000 tons. Even though the original cost of the motor-ship exceeds that of the steamer, its rate of interest return is higher on account of greater earning capacity and smaller operating cost.

The petroleum fields, so far discovered in California, are vast in area and remarkable in output, approximating over 150 square miles of proven ground, and with a potential production for 1914 of approximately 112,000,000 barrels. The United States Geological Survey estimates that the California fields are capable of furnishing a maximum of eight billion barrels of crude petroleum

out of twenty-four billion barrels maximum yet available in the United States. It is fair to state, however, that since this estimate was made by the government agents, additional resources have been discovered in Oklahoma, which no doubt will raise considerably the estimate as to the ultimate extractable oil content of this country. The minimum estimates are about fifty per cent of the maximum in each case. Whether or not the maximum is reached seems immaterial at this time. Competent petroleum engineers and geologists, on independent investigation, state that it is reasonable to believe that the oil fuel of California will dominate the Pacific coast for the next fifty years, and possibly the balance of the present century.

The importance of the California petroleum resources as compared to the rest of the United States, and the production of foreign countries is set forth in statistical data accompanying this article. These statistics show that in the year 1901 California produced eleven per cent of the total output of the United States, the proportion growing steadily until the year 1913, when, according to the United States Geological Survey, the Golden State produced nearly forty per cent of the total petroleum yield of this country. The production of all foreign countries, as compared to California, shows that of the whole, California's output amounted to a little over seven per cent in the year 1901, mounting upward to forty per cent in 1912.

The development of Alaskan coal resources will not affect the practical predominance of California oil for steam-making, and other power production purposes, for years to come. According to figures published in United States Geological Survey Bulletin No. 442-A, of the year 1910, the cost of delivering Alaskan anthracite and bituminous coal to Washington and Oregon ports will approximate $5 per ton, and to California ports 50c per ton additional. By the time the necessary arrangements are made to mine and transport this coal, it is possible that progress in the development of the internal combustion engine will have been so great that the Alaskan product will not threaten the supremacy of liquid fuel for some time to come. Furthermore, the growth in ideals of the conservation of our natural resources will ultimately forbid the use of our bituminous coals under boilers, just as this sentiment must eventually force a discontinuance of the wasteful burning of petroleum in a like manner. The factor of conservation along this line will certainly play an important part in determining the length of time that oil maintains supremacy as a fuel, and this point is taken cognizance of, in estimating the years that liquid fuel will probably predominate. When the oil resources are exhausted, the country will turn to the development of its remarkable shale deposits, and coal will be coked, and the oil residues, and other by-products, turned into their natural industries, instead of going up the chimney into the air. The shale deposits, existing in conjunction with the oil fields of the state, and the coal measures of Utah, Wyoming and other western states, should yield enough oil to guarantee practically an unlimited supply for the future, particularly when it is considered that by virtue of



OIL FIELD NEAR LOS ANGELES.

the internal combustion engine, a price can be paid for oil that will make the mining of these shales profitable.

It is to be regretted that so much information has been peddled to the public heralding the oil business as the long-sought way to "get rich quick." It has done inestimable damage to the industry and its legitimate promoters. The public mind has been educated to believe that the earnings of such corporations as the Standard Oil Company are general in the petroleum industry. This is far from true. The Standard Oil Company is principally a purchaser, transporter, and refiner of crude petroleum. The business of producing oil is totally different. The history of the oil business of California shows that the producer of oil, under a competitive economic system, influenced by considerations of competition, and the diplomacy of rivalry among the marketing factors, in conjunction with the law of supply and demand, can hardly expect stable profits from year to year in an oil region of tremendous potentialities.

The writer is not decrying investment in California oil properties. It is well to point out, however, that the average price per barrel, at the well, for California crude oil during the past fourteen years has been forty-five cents. Competent petroleum engineers estimate that the actual cost of producing oil in California, taking into account depreciation of the producing capabilities of the land, redemption of capital, and development and operating expense, is not far from that figure. Indeed the statement is made that, considering the hazardous and speculative nature of the business, seventy-five cents per barrel should be the minimum price, at the well, to insure profit. In face of a market with very fixed and definite limitations and production potentialities of enormous proportions, millions of barrels of California oil are now being marketed annually at a price below the cost of production. It is certain that, for many years to come, California can produce millions of barrels more oil than can be profitably marketed. Under the unrestricted operation of the law of supply and demand, advance in price to the producer only serves to stimulate production until returns to the producer again fall back to an unprofitable level. It, logically follows, that if the producer is to receive a profit commensurate with the risk of the business, some regulating influence must be brought into play. Some means must be adopted whereby the producer will receive a just economic price for the product, at the same time taking care of the marketer. The question of declaring oil a public utility to meet the present unprofitable situation is occupying the attention of the leaders of the industry. It is proposed that thorough regulation, from producing to marketing, be instituted through the present railroad commission, or some other legally constituted body. The idea is permeating the consciousness of the leaders of the state that, in a higher way, our mineral resources should be regarded as property to be used, and to be held in trust, with regard to the present and future needs of the country. It is being realized that neither human labor nor any other human agency has contributed to the origin of oil. Whatever rights the individual may possess have been derived from the general government and from the state as the original owners. The men of this generation must not be permitted to dissipate a great state asset at continuous financial loss to themselves, as well as to future generations. There can be no such thing as an oil industry without profit, and when this is more fully and concretely realized suitable regulation will come about to the interest of all concerned, based on the principles of conservation of natural resources, and economic fairness to the producer.

Thus, while the present situation from an investment point of view is not encouraging, the future is bright. Well managed and amply financed companies, with reasonably large acreage, offer attractive speculative and investment possibilities, if judicious selection is exercised. California properties are rapidly going into centralized control. The small operator is at a hopeless disadvantage from a marketing standpoint. The capitalist finds his opportunity in consolidation, which reduces the cost of production. Centralization in California has progressed to the point where 65 per cent of the output of the state is controlled outright by the marketers and consumers, leaving 35 per cent to be purchased in the open market. Amalgamation of producing properties will assist materially the operation of measures of regulation and work for the best interest of producer and consumer. But the great story of California oil lies in the statistics accompanying this article.

ESTIMATE OF CALIFORNIA'S PROVEN PETROLEUM LANDS AND REMAINING RECOVERABLE OIL CONTENT

Counties	Estimated Proven Oil Acreage	Estimated Recoverable Oil Content	Production to Jany. 1, 1915	Estimated Remaining Recoverable Oil Content
Fresno	30,000	1,150,000,000	154,843,000	995,157,000
Kern	53,000	2,375,000,000	397,156,645	1,977,843,355
Los Angeles, Orange, Santa Barbara, Ventura, San Luis Obispo, Santa Clara	17,000	775,000,000	192,737,000	582,263,000
TOTAL	100,000	4,300,000,000	744,736,645	3,555,263,355

NOTE.—Estimates of additional probable oil lands range from 250,000 to 544,000 acres, the greater part of which, if proven at all, being considered as of low productivity per acre.

PRODUCTION IN CALIFORNIA AS COMPARED TO ALL FOREIGN COUNTRIES PREPARED FROM RECORDS OF UNITED STATES GEOLOGICAL SURVEY

Year	California	Foreign Countries	Total	California's Percentage
1901	7,710,315	96,384,167	104,094,482	7.4%
1902	13,984,268	96,391,106	110,375,374	12.7
1903	24,382,472	94,742,174	119,124,646	20.5
1904	29,649,434	102,170,629	131,820,063	22.5
1905	33,427,473	80,928,598	114,356,071	29.2
FIVE YEARS.	109,153,962	470,616,674	579,770,636	18.8%
1906	33,098,598	86,899,474	119,998,072	27.6%
1907	39,748,375	96,533,286	136,281,661	29.2
1908	44,854,737	105,041,543	149,896,280	29.9
1909	55,471,601	115,155,199	170,626,800	32.5
1910	73,010,560	117,917,056	190,927,616	38.2
FIVE YEARS.	246,183,871	521,546,558	767,730,429	32.1%
1911	81,134,391	125,062,794	206,197,185	39.4%
1912	86,450,767	129,065,018	215,515,785	40.1
1913	97,764,525	.....	.....	....
1914	105,000,000	.....	.....	....

NOTE.—While complete figures are not available, production in foreign countries will probably show a decline in 1913 and 1914.

PRODUCTION AND VALUE OF PETROLEUM IN CALIFORNIA FROM 1876 TO 1914 PREPARED FROM RECORDS OF U. S. GEOLOGICAL SURVEY

Year.	Production: Barrels Production	Production: Per Cent Gained	Production: Total Yield Series Years	Years	Value: Yearly Value	Value: Per Cent Gained	Value: Average Per Barrel	Value: Total Value Series Years	Value: Per Barrel
1876	12,000	....	12,000	1	$ 36,000	....	$3.00	$ 36,000	....
1877	13,000	8.3%	25,000	2	39,000	8.3%	3.00	75,000	....
1878	15,227	17.1	40,227	3	45,681	17.1	3.00	120,681	....
1879	19,858	30.4	60,085	4	59,574	30.4	3.00	180,255	....
1880	40,552	104.2	100,637	5	121,656	104.2	3.00	301,911	$3.00
FIVE YEARS	100,637	....	100,637		$ 301,911	.....	$3.00	$ 301,911	....
1881	99,862	146.3%	200,499	6	$ 199,724	6.4%	$2.00	$ 501,635	....
1882	128,636	28.8	329,135	7	257,272	28.8	2.00	758,907	....
1883	142,857	11.1	471,992	8	285,714	11.1	2.00	1,044,621	....
1884	262,000	83.4	733,992	9	524,000	83.4	2.00	1,568,621	....
1885	325,000	24.0	1,058,992	10	650,000	24.0	2.00	2,218,621	$2.09
FIVE YEARS	958,355	852.3%	.....		$ 1,916,710	534.8%	$2.00	.....	....
1886	377,145	16.0%	1,436,137	11	$ 754,290	16.0%	$2.00	$ 2,972,911	....
1887	678,572	80.0	2,114,709	12	1,357,144	80.0	2.00	4,330,055	....
1888	690,333	1.7	2,805,042	13	1,380,666	1.7	2.00	5,710,721	....
1889	303,220	*56.0	3,108,262	14	368,048	*81.5	1.21	6,078,769	....
1890	307,360	0.1	3,415,622	15	384,200	4.3	1.25	6,462,969	$1.89
FIVE YEARS	2,356,630	145.9%	.....		$ 4,244,348	121.4%	$1.80	.....	....
1891	323,600	5.2%	3,739,222	16	$ 401,264	4.4%	$1.24	$ 6,864,233	....
1892	385,049	18.7	4,124,271	17	561,333	39.9	1.46	7,425,566	....
1893	470,179	22.1	4,594,450	18	608,092	8.3	1.29	8,033,658	....
1894	783,078	66.5	5,377,528	19	1,064,521	74.9	1.36	9,098,179	....
1895	1,245,339	59.0	6,622,867	20	1,000,235	*6.0	.80	10,098,414	$1.52
FIVE YEARS	3,207,245	36.1%	.....		$ 3,635,445	14.3%	$1.13	.....	....
1896	1,257,780	0.9%	7,880,647	21	$ 1,180,793	18.0%	$0.94	$ 11,279,207	....
1897	1,911,569	51.9	9,792,216	22	1,918,269	62.4	1.00	13,197,476	....
1898	2,249,088	17.6	12,041,304	23	2,376,420	23.9	1.06	15,573,896	....
1899	2,677,875	19.0	14,719,179	24	2,660,793	11.9	.99	18,234,689	....
1900	4,329,950	61.7	19,049,129	25	4,152,928	56.1	.96	22,387,617	$1.17
FIVE YEARS	12,426,262	287.4%	.....		$ 12,289,203	238.0%	$0.99	.....	....
1901	7,710,315	78.0%	26,759,444	26	$ 2,961,102	28.7%	$0.38	$ 25,348,719	....
1902	13,984,268	59.1	40,743,712	27	4,873,617	64.5	.35	30,222,336	....
1903	24,382,472	74.3	65,126,184	28	7,399,349	51.8	.30	37,621,685	....
1904	29,649,434	21.6	94,775,618	29	8,265,434	11.7	.28	45,887,119	....
1905	33,427,473	12.7	128,203,091	30	8,201,846	0.7	.25	54,088,965	$0.42
FIVE YEARS	109,153,962	778.4%	.....		$ 31,701,348	157.9%	$0.29	.....	....
1906	33,098,598	*0.9%	161,301,689	31	$ 9,553,430	16.5%	$0.29	$ 63,642,395	....
1907	39,748,375	20.1	201,050,064	32	14,699,956	53.8	.37	78,342,351	....
1908	44,854,737	12.8	245,904,801	33	23,433,502	59.4	.52	101,775,853	....
1909	55,471,601	23.6	301,376,402	34	30,756,713	31.2	.55	132,532,566	....
1910	73,010,560	31.6	374,386,962	35	35,749,473	16.2	.49	168,282,039	$0.45
FIVE YEARS	246,183,871	125.5%	.....		$114,193,074	260.2%	$0.46	.....	....
1911	81,134,391	11.1%	455,521,353	36	$ 38,719,080	8.3%	$0.48	$207,001,119	....
1912	86,450,767	6.6	541,972,120	37	39,213,588	1.3	.45	246,214,707	....
1913	97,764,525	13.1	639,736,645	38	45,661,400	16.4	.47	291,876,107	....
1914	105,000,000	7.4	744,736,645	39	47,250,000	3.4	.45	339,126,107	$0.45

*Loss.

*Loss.

NOTE.—Figures for 1914 are estimated based on a production of approximately 53,000,000 barrels for the first half of the year. In that period fully 3,000,000 barrels were shut in, indicating a potential production strength of 56,000 barrels for the six months, or approximately 112,000,000 barrels for 1914, figured at the same rate of output.

PRODUCTION AND VALUE OF PETROLEUM IN THE U. S. FROM 1876 TO 1913 INDICATING CALIFORNIA IN COMPARISON TO THE WHOLE PREPARED FROM RECORDS OF UNITED STATES GEOLOGICAL SURVEY

Year	Production: California	Production: 15 Other States	Production: Total	Production: Calif's Per Cent	Year	Value: California	Value: 15 Other States	Value: Total	Value: Calif's Per Cent
1876	12,000	9,120,669	9,132,669	.....	1876	$ 86,000	$ 22,946,822	$ 22,982,822	.....
1877	13,000	13,337,363	13,350,363	.....	1877	39,000	31,749,566	31,788,566	.....
1878	15,227	15,381,641	15,396,868	.....	1878	45,681	17,998,839	18,044,520	.....
1879	19,858	19,894,288	19,914,146	.....	1879	59,574	17,151,134	17,210,708	.....
1880	40,552	26,245,571	26,286,123	.....	1880	121,656	24,478,982	24,600,638	.....
FIVE YEARS.	100,637	83,979,532	84,080,169	.....	FIVE YEARS.	$ 301,911	$114,325,343	$114,627,254	.....
1881	99,862	27,561,376	27,661,238	.....	1881	$ 199,724	$ 23,312,327	$ 23,512,051	0.9%
1882	128,636	30,221,261	30,349,897	.....	1882	257,272	23,373,893	23,631,165	1.1
1883	142,857	23,306,776	23,449,633	.....	1883	285,714	25,454,538	25,740,252	1.1
1884	262,000	23,956,438	24,218,438	.....	1884	524,000	19,952,924	20,476,924	2.6
1885	325,000	21,533,785	21,858,785	.....	1885	650,000	18,543,694	19,193,694	3.4
FIVE YEARS.	958,355	126,579,636	127,537,991	.....	FIVE YEARS.	$ 1,916,710	$110,637,376	$112,554,086	1.7%
1886	377,145	27,687,696	28,064,841	1.3%	1886	$ 754,290	$ 19,274,167	$ 20,028,457	3.8%
1887	678,572	27,604,911	28,283,483	2.4	1887	1,357,144	17,499,462	18,856,606	7.2
1888	690,333	26,921,692	27,612,025	2.5	1888	1,380,666	16,569,687	17,950,353	8.1
1889	303,220	34,860,293	35,163,513	0.9	1889	368,048	26,595,292	26,963,340	1.4
1890	307,360	45,516,212	45,823,572	0.7	1890	384,200	34,980,905	35,365,105	1.1
FIVE YEARS.	2,356,630	162,590,804	164,947,434	1.4%	FIVE YEARS.	$ 4,244,348	$114,919,513	$119,163,861	3.6%
1891	323,600	53,969,055	54,292,655	0.6%	1891	$ 401,264	$ 30,125,289	$ 30,526,553	1.3%
1892	385,049	50,129,608	50,514,657	0.8	1892	561,333	25,345,130	25,906,463	2.2
1893	470,179	47,960,887	48,431,066	1.0	1893	608,092	28,324,234	28,932,326	2.1
1894	783,078	48,561,438	49,344,516	1.6	1894	1,064,521	34,457,574	35,522,095	3.0
1895	1,245,339	51,646,937	52,892,276	2.4	1895	1,000,235	56,691,044	57,691,279	1.7
FIVE YEARS.	3,207,245	252,267,925	255,475,170	1.2%	FIVE YEARS.	$ 3,635,445	$174,943,271	$178,578,716	2.0%
1896	1,257,780	59,702,581	60,960,361	2.1%	1896	$ 1,180,793	$ 57,337,916	$ 58,518,709	2.0%
1897	1,911,569	58,563,947	60,475,516	3.2	1897	1,918,269	39,011,342	40,929,611	4.7
1898	2,249,088	53,115,145	55,364,233	4.1	1898	2,376,420	41,816,939	44,193,359	5.4
1899	2,677,875	54,392,975	57,070,850	4.7	1899	2,660,793	61,943,111	64,603,904	4.1
1900	4,329,950	59,290,579	63,620,529	6.8	1900	4,152,928	71,599,763	75,752,691	5.5
FIVE YEARS.	12,426,262	285,065,227	297,491,489	4.2%	FIVE YEARS.	$ 12,289,203	$271,709,071	$283,998,274	4.3%
1901	7,710,315	61,678,879	69,389,194	11.1%	1901	$ 2,961,102	$ 63,456,233	$ 66,417,335	4.5%
1902	13,984,268	74,782,648	88,766,916	15.8	1902	4,873,617	66,305,293	71,178,910	6.8
1903	24,382,472	76,078,865	100,461,337	24.3	1903	7,399,349	87,294,701	94,694,050	7.8
1904	29,649,434	87,431,526	117,080,960	25.3	1904	8,265,434	92,910,021	101,175,455	8.2
1905	33,427,473	101,290,107	134,717,580	24.8	1905	8,201,846	75,955,553	84,157,399	9.8
FIVE YEARS.	109,153,962	401,262,025	510,415,987	21.4%	FIVE YEARS.	$ 31,701,348	$385,921,801	$417,623,149	7.6%
1906	33,098,598	93,395,338	126,493,936	26.2%	1906	$ 9,553,430	$ 82,891,305	$ 92,444,735	10.3%
1907	39,748,375	126,346,960	166,095,335	23.9	1907	14,699,956	105,406,793	120,106,749	12.2
1908	44,854,737	133,672,618	178,527,355	25.1	1908	23,433,502	105,645,682	129,079,184	18.1
1909	55,471,601	127,699,273	183,170,874	30.3	1909	30,756,713	97,571,774	128,328,487	23.9
1910	73,010,560	136,546,688	209,557,248	34.8	1910	35,749,473	92,150,215	127,899,688	27.9
FIVE YEARS.	246,183,871	617,660,877	863,844,748	28.5%	FIVE YEARS.	$114,193,074	$483,665,769	$597,858,843	19.1%
1911	81,134,391	139,315,000	220,449,391	36.8%	1911	$ 38,719,080	$ 95,325,672	$134,044,752	28.9%
1912	86,450,767	135,662,451	222,113,218	38.9	1912	39,213,588	124,588,746	163,802,334	23.9
1913	97,764,525	150,681,705	248,446,230	39.4	1913	45,661,400	191,459,988	237,121,388	19.3
1914	105,000,000	Estimated.			1914	.....	.....	.....	.....

A BUSY PIER IN SAN FRANCISCO.

THE SHIPPING INDUSTRY OF THE PACIFIC COAST.

By Capt. Robert Dollar.

This industry is second to none in importance in the Pacific Coast States. It is difficult to get at the exact tonnage owned, as, on account of the high taxes imposed, many coastwise vessels are registered in Minnesota, Maine, New York and New Jersey; and, on account of our unjust and unreasonable laws, a great many large cargo steamers, owned by citizens of the Pacific Coast States, are registered in foreign countries, fly their flags, and are principally engaged in foreign commerce to and from this coast. The approximate tonnage of vessels is 1,049,296 gross registered tons. The money value also can only be approximated; it is estimated at sixty million dollars.

The vessels engaged in the domestic trade are more than sufficient for present requirements. At this writing some thirty steamers are laid up, so I think the increase will be gradual and will only come as trade conditions warrant. In the Foreign Trade, we look for very great advancement and development. This will be brought about by the great increase of trade that we will get from the opening up and development of China. Thirty-five years ago the Pacific Mail was the only company operating steamers, and the combined cargo capacity, of all their steamers at that time, was not as great as is that of one of their large, modern steamers. If the increase keeps up at the same rate as during that period, long before this century closes, the center of the world's commercial activity will be transferred from the Atlantic to the Pacific.

It is generally supposed that the opening of the canal will take away a great deal of freight from our ports, but from the line of the great northern circle from Panama to Japan, San Diego is only 225 miles, Los Angeles 245, San Francisco 325, Eureka 430, Astoria 670, the entrance to the Straits of Juan de Fuca 800; so it will be seen that the deviation will be very slight.

The Pacific Coast is favored with many good and commodious harbours. In the extreme South is San Diego, having ample accommodations for all the requirements; next Los Angeles with more than they require and by dredging they can extend indefinitely; then San Francisco with sufficient anchorage for all the navies of the world. Eureka has plenty of room for her rapidly growing trade. In Oregon is Coos Bay. As soon as contemplated improvements are completed, the largest tramp steamers afloat can find berth there. Next comes the Columbia River. When the jetties and dredging contemplated are completed, it can receive vessels drawing thirty feet of water. Willapa and Grays Harbor are rapidly increasing their facilities to receive large vessels. At present steamers 400 feet long and drawing 20 feet have no trouble going in and out. Puget Sound, unsurpassed for its land locked bays, has sufficient water to take at one time all the ships of the world. Seattle and Tacoma are rapidly building wharves to accommodate the great increase expected after the Canal is in operation.

Our shipping may be divided into three parts, first, Coastwise, second, Inter-Coast, (via Panama), and third, Foreign.

The bulk of the coastwise cargoes carried are from north to south, lumber furnishing more than 95% of the whole. Vessels carry bulk cargoes north, but not to exceed 10% of their capacity. The steamers engaged in carrying lumber on this Coast are constructed specially for this trade and are entirely different than can be seen in any other part of the world. The machinery is placed aft, and from 30% to 50% of the cargo is carried on deck and with perfect safety to both the vessel and cargo. The ordinary height of those deckloads are from 12 to 18 feet.

The trade that will go from one seaboard of the United States to the other is problematical. The value of commodities carried in 1913 was $80,026,517. This was an increase from 1900 of $73,208,737, although handicapped by having to trans-ship by rail either via Tehantepec or Panama. As to what increase the opening of the Canal will effect we must wait trade develop-

ment for a year or two, before we can even make any calculations. That the increase will be gradual, we are sure, although some expect an immediate expansion. In this they will be disappointed, but that there will be a tremendous increase of this trade, admits no argument. The difference between rail and all water rates will be sufficient to warrant this prediction. For the opening of the Canal the rate of freight has been reduced about 30%.

Foreign trade has not been pushed as it should. The local or domestic demand has satisfied all producers, therefore there was little incentive to go farther afield as long as the home consumption kept up. Now we see that we must reach out for foreign markets. So far we have only exported the products of the forest, fields and fisheries; now we must reach out for manufacturies. Up to the present time labor conditions have been such as to effectually preclude the possibility of manufacturing on this coast for export. Now we feel that, with the opening of the canal, a great number of emigrants will reach our shores. Employment must be found for them either in the cultivation of the fields or in manufacturing as very few will have money enough to take up land. We can expect factories to be built because raw material can be gotten as cheap as in any part of the United States. Iron ore of a better quality can be laid down in Pacific Coast ports at a lower price than the supply is delivered at Pittsburg. Cokeing coal can be delivered here at a price that will enable us to produce coke at competitive prices if the most modern by-product ovens are employed. Thus there is no reason why we cannot produce iron and steel, not only for our own requirements, but for export also. Raw cotton and wool can be delivered at our sea-board as cheap as anywhere else, as both are grown near by.

The opening of markets of China warrants the prediction of an enormous commerce between that country and ours. The Philippine trade that has increased by leaps and bounds and, if political conditions permit, a great trade will result. Japan, India and the East Indies will all increase their trade with us. The custom house statistics are extremely encouraging. In 1856 our total exports from this entire coast were $3,460,448, in 1880 $38,888,418, in 1913 $146,856,469. If this same ratio of increase continues for the next 60 years, it can easily be seen that the fulfillment of my prediction will be accomplished, that the Atlantic trade will be superseded by the Pacific, and that the commerce of San Francisco will exceed that of New York of today.

A VESSEL ESPECIALLY DESIGNED FOR TIMBER CARRYING. NOTE THE LENGTH OF CLEAR HULL AND DECK ROOM.

A SALMON CANNERY IN WASHINGTON SHOWING SOME OF THE TRAPS.

FISH FACTS AND FIGURES.

Commercial, Financial and Economic Features of the Pacific Coast Fisheries.

By Miller Freeman. Editor of "The Pacific Fisherman."

Food is the prime requisite of life and where, when and how to get it, how to pay for it, and how much, constitute the vital problem of the race. The traffic in food is the biggest item in the world's commerce.

Fish are food—nay more, they are cheap food. As such they are surely entitled to serious consideration in this day and age. Americans, it is true, are not, broadly speaking, a fish eating people and it is in America that the High Cost of Living holds untrammelled sway. These two facts are worth weighing in their relation to one another.

It seems strange that Americans—not themselves essentially fish consumers, should have developed, and today control, what is probably the world's most important fishery. It has sprung up upon the Pacific Coast within the past half century and, in spite of the important position it now occupies as demonstrated by statistics, it is still considered in its infancy.

So rapid has been the development of the commercial fisheries of the West Coast that few people east of the continental backbone have even an approximate idea of their present size and importance. The total fisheries products of the Pacific Coast were worth, last year, about $60,000,000 to the producer, or with transportation and distributing costs $100,000,000 to the consumer.

One reason why, perhaps, so little is understood about the Pacific Fisheries is because they differ so radically from those of the Atlantic coast, upon which most casual observers formulate their opinions. On the east coast large fishing banks are located in a position really adjacent to large consuming centers such as Boston, New York, and Philadelphia, with the result that most of the fish is handled in a fresh state. The Pacific Coast is comparatively lightly populated, and its fishery products must find their chief market in the Eastern states and abroad. Owing to the fact that these fisheries are situated so far from the consuming centers, the bulk of the product must be prepared, with the result that here we have not only a fishery of unparalleled importance, but a large and thriving manufacturing business.

Take, for instance, the example of the salmon canning industry, the product of which comprises three-fourths of the sixty million dollar total. Last year this industry consumed, in raw materials, 575,000,000 pounds of fish; 30,000,000,000 square inches of tin plate; 8,000,000 packing cases; 60,000,000 pounds of salt; 4,000,000 pounds each of pig tin and pig lead; 360,000,000 cement coated nails; 400,000,000 lithographed labels, and thousands of gallons of gasolene, kerosene, lacquer

and acids. With this it produced some four hundred million sealed packages of nutritious, palatable, and economical food.

To further show how this differs from the ordinary conception of a fishing business, it might be mentioned that these fish are, in the main, not caught by hook and line, but with such gear as salmon traps and purse seines. In the traps the fish are kept alive in the water until ready for packing, and are not touched by human hands until they are delivered at the packing establishment.

The fish are handled with large power vessels driven by gas engines, less picturesque, but more practical than the fishing smacks of the Atlantic. From an initial pack of 2,000 cases, the business grew by leaps and bounds, the output of 1913 being 8,000,000 cases of 48 pounds each. This industry employs over 30,000 people and, since the entire pack if made in a few months in the summer season, an enormous equipment is required to handle it successfully.

Canned salmon now fills a tremendous domestic demand, and may be found on sale in every country in the world. Twenty-five per cent of the output is sold abroad and it is the largest item of canned food exported by the United States.

The fish canning activities of the coast are by no means limited to salmon. Within the past few years, there has sprung up the practice of canning a species of tuna found on the coast of California and, although only a few years old, this business exceeds a million dollars a year. Besides this there are canned large quantities of clams, crabs, sardines, etc.

SALMON ON THE FLOOR OF THE CANNERY.

The manufacture of engines for the fishing fleet is in itself a large industry on the Pacific Coast.

In the canneries, modern sanitary machinery is used throughout and the fish are even butchered by a mechanical device known as the "Iron Chink," which performs this difficult operation without the aid of a human hand.

In 1913 this branch celebrated its fiftieth anniversary with the largest output in its history. It was founded on the Sacramento half a century ago by some pioneers experienced in the lobster canneries of Maine. Today the business finds its principal seat in the state of Washington, and in Alaska. The Columbia River, while not numerically a big factor, will always continue to enjoy an enviable reputation for the quality of its fish.

In the fresh fisheries the halibut is of paramount importance. As this fish must find its principal market in Eastern States, it must be shipped packed in ice, or frozen. This has necessitated the construction, at various points along the coast, of ice making plants and cold storages. The largest fish cold storage plant in the world, is now located at the Pacific Coast and has a capacity of 15,000,000 pounds. The halibut fisheries alone produce about 60,000,000 pounds of fish a year and, in addition to this, there is a consider-

able business in fresh salmon, herring, and various kinds of cod.

The salt fish business is also an important branch of the industry. This group includes, as its most important branch, the business of packing large, choice salmon in light brine, and shipping them to Germany where they are washed, smoked, and canned. The current year's business has of course been disorganized by the war, but last year some 20,000,000 salmon were prepared in this fashion. The general salt fish business includes the packing of salmon and herring in barrels, and salting codfish and herring in bulk.

The manufacture of oil and fertilizer, together with miscellaneous chemical by-products from whales, cannery offal and non-edible fish, is also another branch of the fisheries which is increasing in importance with the passing of years.

It is very fascinating to contemplate the future of this industry. There are at least 250 varieties of edible fish on the Pacific Coast, of which not more than a dozen are being exploited today, and yet these dozen have elevated the fishery to a sixty million dollar business. The finding of a market for California's tuna, which was unutilized up to a few years ago, is only one example of the many developments which years are sure to bring. In this instance, we have a case of a million dollar business springing up in a twinkling from a fish which had not been regarded as edible, and southern California ports are the richer by a score of fine food factories employing hundreds.

The raw material—the fish—is to be found in these waters in inconceivable quantities, and growth is, at present, limited only by the market—by the amount of fish that can be packed and sold profitably. With the extension of the markets the industry will logically expand.

All eyes are at present turned to the Panama Canal. Its economical altering of trade routes is bound to have a beneficial effect upon Pacific Fisheries, and it may be said that readjustment in accordance with the changed conditions is going on even now. Every few days, large cargoes of canned salmon—a hundred thousand cases and more—leave the Pacific for Atlantic ports. These goods travel under a water rate of thirty cents a hundred pounds, compared to seventy cents present rail rate. As the chief markets, not only for canned salmon but our other fisheries products, lies in the East and abroad, the cost of getting the finished product to consumers is going to be reduced, and this will represent a saving to purchasers which is bound to result in increased consumption.

Direct benefits will come through a reduction in the cost of materials and equipment to the packers, as a large amount of these goods come from the east.

The canal will unquestionably make the Pacific Fisheries a bigger figure in the export trade than ever before. A general movement, originated by the writer, to secure a reduction in foreign duties on canned salmon is beginning to bear fruit and, coincident with the lower cost of getting these goods to foreign ports, this opens up new and rich markets. It will be possible to ship cheap frozen fish direct to Europe, and this branch alone will unquestionably receive a tremendous impetus when conditions on the continent have adjusted themselves, as they eventually must. The business of handling low priced salt fish in barrels and bulk will also expand, as a cheap food is more than welcome in many foreign countries.

Coupled with the natural growth incident to the continued extension of domestic markets, the opening of the canal marks the beginning of a new era in the Pacific Fisheries. The fishing industry of the Pacific Coast is an industrial benefactor. The money received for its products flows into a hundred trade channels and is an important factor in the general prosperity of the nation.

FISHING FLEET OF THE ALASKA PACKERS.

THE EXPOSITIONS

COMPLETE SECTIONAL PANORAMA OF EXPOSITION. WEST SECTION.

THE PALACE OF EDUCATION, SHOWING THE WESTERN ENTRANCE.

SECTIONAL PANORAMA OF EXPOSITION. EAST CENTRAL SECTION.

SECTIONAL PANORAMA OF THE EXPOSITION. WEST CENTRAL SECTION.

PALACE OF MANUFACTURES FROM THE SOUTH GARDENS.

SECTIONAL PANORAMA OF THE EXPOSITION. EAST SECTION.

The Panama California Exposition at San Diego

There is now in progress an engrossing experiment by the furthest south of the American ports on the Pacific, San Diego,—an experiment which is so closely bound up with San Diego's Panama-California Exposition of 1915, as to appear partly as a cause, partly as an effect. One important point is that it demonstrates a new idea in exposition work—a serious purpose and something of genuine economic interest rather than the futile hope of an ephemeral "boom." So far as is known this is unique. Broadly, this purpose is to build up the great southwest area which is barely tapped today. No less interesting is the method whereby this purpose is to be carried out.

San Diego's present back country is almost negligible. Not even the Imperial Valley, directly east but over the first divide, can be considered as tributary to the coast city under present traffic conditions. To grasp the idea of the program there must be a general understanding of geographical conditions—San Diego the first port of call north of the Canal, nearer to the new waterway by 600 miles than is San Francisco, also much nearer the east, owing to the curvature of the California coast, and, yet again, very much nearer in railroad time and cost by reason of the lower grades which the Southern Sierras offer. The last two are railroad factors, the first is a water factor.

Under the personal direction of H. O. Davis, director general of the Exposition, a corps of statisticians, equipped with the government and state reports, private data and water and rail freight information, has been at work for several months. The figures this corps has prepared are now made public for the first time.

The first task was to determine the potential "back country." A carload of steel was brought from Pittsburgh to eastern tidewater, transferred to boat, carried through the Canal and up to San Diego, there transferred to train and carried eastward. The same theoretical transfer was made with other commodities from various points. Then the same units were shipped to the southwest by all-rail routes. The cost of both routes was kept by zones.

The charts completed, the statisticians found a fairly steady line where the cost of the two routes became identical. Everything west and south of that line, then, was reserved as San Diego's back country, inasmuch as every point within that territory could obtain its goods from the east more cheaply via San Diego than by any other way. Similarly, all products of that country could be shipped to the Atlantic ports more cheaply via San Diego than by any other way.

The territory so defined includes Southern California, most of Nevada, southern Utah, southwestern Colorado, all of New Mexico and all of Arizona. Sections which are different in latitude and altitude are capable of producing an extraordinary variety of raw materials. The statisticians tossed aside their freight rate statistics and set about finding out what they are.

By means of detail maps and the data mentioned, the statisticians prepared their reports on each of the counties and valleys in the southwest, by states. Thus in southwest Colorado were 17 counties, in southern California 11 counties, in Arizona 14 counties, in New Mexico 26 counties, in Nevada for the southern half 8, and for the southern half of Utah 17 counties. Some of the individual counties contain as many as twenty separate valleys and plateaus, but all of these containing 2,000 acres or over are itemized individually. The tabular report shows population, altitude, water sources, length of growing season, principal farm products, the number of railroads or distance to the nearest road and the principal town. Then comes the statement of development, the acreage of irrigated land in 1913, of other cultivated land, the percentage of increase over 1910, the acreage of other irrigable lands and other arable lands, and the total area of land which has agricultural possibilities.

So much as a basis. Certain farmland is of such a character as to make it most profitable in 320-acre units. Other land can be operated to better advantage in 40-acre tracts, even smaller. But for estimate purposes these two classifications have been made and for each river valley or plateau there is given the total number of possible 320-acre and 40-acre farms, their total being an approximation of what the agricultural land will have when it is fully developed. Whatever the

Rates given in car load quantities.

Commodity.	Shipping Point.	Present Routes: Rail Rate to New York	Present Routes: Water Rate to San Diego	Present Routes: Joint Rail and Water Rate to San Diego	Present Routes: All Rail Rate to San Diego	Via Panama Canal: Rail Rate to New York	Via Panama Canal: Water Rate to San Diego	Via Panama Canal: Joint Rail and Water Rate to San Diego	Via Panama Canal: All Rail Rate to San Diego
1. Carpets	Worcester, Mass.	$0.22	$1.15	$1.37	$1.85	$0.22	$0.60	$0.82	$1.85
2. Clothing	Rochester, N. Y.	...	2.00	....	3.00	....	.60	....	3.00
3. Dry goods	Fall River, Mass.	.32	2.00	2.32	1.10	.32	.60	.92	1.10
4. Electrical appliances and supplies	Pittsburgh, Pa.	.30	1.00	1.30	1.60	.30	.55	.85	1.60
5. Furniture	Grand Rapids, Mich.	.48	1.50	1.98	2.65	.48	.60	1.08	2.65
6. Hardware	Cleveland, Ohio	.25	1.00	1.25	....	.25	.60	.85	....
7. Structural iron and steel	Pittsburgh, Pa.	.16	.60	.76	.80	.16	.30	.46	.80
8. Castings	Cleveland, Ohio	.16	.80	.96	.80	.16	.60	.76	.80
9. Safes, etc.	Hamilton, Ohio	.30½	.90	1.20½	1.75	.30½	.40	.70½	1.75
10. Pipe, wrought iron	Paterson, N. J.	.07	.45	.52	.65	.07	.25	.32	.65
11. Pipe fittings	Paterson, N. J.	.07	.50	.57	.70	.07	.25	.32	.70
12. Gas and gasolene engines	Detroit	.23½	1.00	1.23½	1.40	.23½	.40	.63½	1.40
13. Bathtubs	Pittsburgh, Pa.	.21	1.25	1.46	1.80	.21	.60	.81	1.80
14. Wire fencing, in rolls	Worcester, Mass.	.17	.65	.82	.85	.17	.25	.42	.85

unit of operation, the average farm population is found to be seven persons, and on this basis the probable population is figured.

Then there is a return to the government census figures, and a citation of the value of all lands, all farm property, and domestic animals, poultry and bees. From the same source is taken a report on the value of all livestock products in 1909, of all crops, finally of all mineral products.

These data have been carefully checked and assembled, by counties, by states, and finally arranged in a single aggregate table for the entire southwest.

There is no mention of manufacturing or of cities, the entire tabulation concerning only land development and the potentialities of agriculture. Hence the moderate increase of population, inasmuch as no allowance is made for municipal growth.

It is the agricultural possibilities that demand attention. Southern California is nearly half developed, so far as occupation is concerned. Southwestern Colorado is about a third occupied. But how of Utah and Arizona and Nevada and New Mexico? Or the aggregate for the entire southwest? The total area of irrigated land under cultivation in 1913 was 4,229,704 acres, with 3,847,161 other cultivated lands, a total of 8,076,865 acres. The total of irrigable lands other than that was 22,314,527 acres, with 21,637,550 acres of other arable lands idle, a total of 43,952,077 acres—roughly five and a half times as much as is now under cultivation.

Skipping the next item, the table shows the value of all farm property in 1910. It figures $1,031,942,705. It shows the output from the farms in crops and livestock products in 1909 as $143,728,991 entirely aside from the $136,718,238 mineral products.

There are further figures in the tables that are most impressive. The thirty standard crops of the southwest, fruits, grapes, grains, grasses, vegetables, cotton and nuts, are listed, with the averages for the different sections, price per acre, and price for the total investment in units found operated most economically. On that investment is shown the annual gross, the cost of labor, of water, of team hire, running expense for the family, and interest at 7 per cent. The net results follow naturally.

What of the goods which must be purchased by the people who occupy these 742,931 farms? Here are figures which have been compiled by specialists in that field, figures for the lumber that will be needed, the cement, the hardware, paints, farm machinery, house, implements, every necessary article of furniture and furnishings for the farm and the house, 72 items in all, figured separately for the six states, and the totals are most interesting. For present purposes it is sufficient to mention only the total, $4,148,378,117.

The Exposition's methods of impressing the facts developed by these statistics is unique. For instance, a complete equipment of heavy machinery, such as is used in large scale farming, will be in actual operation; in a bearing orchard will be demonstrated the most advanced methods of caring for fruit trees; a model five acre irrigated farm, already in a high state of cultivation, shows what a great variety of fruits, vegetables, and berries may be profitably grown, on a small scale, in the Southwest. A model poultry yard and bungalow complete this exhibit.

From the standpoint of settlement, this intensive farming display is significant, as it shows in concrete form the possibilities of the small farm.

	Southwestern Colorado	Southern California	Arizona	New Mexico	South Half Nevada	South Half Utah	Total Southwest
Population, 1910	112,526	815,452	204,354	327,301	36,596	131,079	1,627,308
Probable farm population after total number is reached at rate of seven persons per farm	399,784	1,076,978	860,195	1,247,554	730,009	885,997	5,200,517
Acreage of irrigated lands under cultivation, 1913	730,533	1,044,894	600,000	1,013,777	227,000	613,500	4,229,704
Acreage of other lands under cultivation, 1913	515,967	1,965,694	27,500	868,000	55,000	415,000	3,847,161
Acreage of other irrigable lands, 1913	1,361,500	4,723,527	3,919,000	4,858,500	3,679,500	3,772,500	22,314,527
Acreage of other arable lands, 1913	1,024,000	1,220,550	3,143,500	9,185,000	2,064,500	5,000,000	21,637,550
Total acreage of all agricultural lands, 1913	3,632,000	8,954,665	7,690,000	15,925,277	6,026,000	9,801,000	52,028,942
Possible number of irrigated 40-acre farms	52,300	144,210	112,975	146,807	97,662	109,650	663,604
Possible number of 320-acre farms of other arable lands	4,812	9,644	9,910	31,415	6,625	16,921	79,327
Total number of possible farms of all agricultural land	57,112	153,854	122,885	178,222	104,287	126,571	742,931
Value of all farm property, 1910	119,642,014	595,580,821	75,123,970	159,447,990	15,998,372	66,149,538	1,031,942,705
Value of all lands, 1910	92,268,698	511,420,821	42,349,737	98,806,497	10,209,146	40,613,771	795,668,670
Value of domestic animals, poultry and bees	15,219,741	33,800,481	26,050,870	43,494,674	3,750,201	16,415,179	138,731,146
Value of live stock products and domestic animals sold or slaughtered	7,164,911	17,223,748	7,206,443	14,969,422	1,555,861	6,124,321	54,244,706
Value of all crops, 1909	12,559,447	52,749,243	5,496,872	8,922,397	2,028,597	7,727,729	89,484,285
Value of farm products, 1909	19,724,358	69,972,991	12,703,315	23,891,819	3,584,458	13,852,050	143,728,991
Value of mineral products, 1911	9,961,890	31,400,950	44,157,223	7,230,768	30,424,565	13,542,842	136,718,238

There are plenty of these small farms in the west. A little distance from San Diego, almost on the border of Mexico, lies an important colony of "little landers," many of them farming in units of less than an acre, and yet selling enough garden truck from that tiny spot to give them a sure living, and a sure, though small, annual profit. A colony of Japanese, situated in the Mission Valley, near the old mission of San Diego de Alcala, demonstrates the efficiency of intensive farming quite as vividly.

If any considerable portion of the southwest be settled in this way, naturally the statistics prepared by the Exposition will prove underestimates. They are averages entirely, but by far the best figures of the sort prepared up to the present. Also they are ample evidence of why San Diego is holding its Exposition of 1915, regardless of the 1915 program of San Francisco. The smaller city has a most impressive story to tell the world, and incidentally a stage of gorgeous beauty on which to tell it.

Three Principal Species of Pacific Coast Timber.

SUGAR AND WHITE PINE.

REDWOOD.

FIR.

Complete Record of All Timber Bonds Handled by CLARK L. POOLE & CO.

As of July 1st, 1914

Of the total $80,483,000 of timber land bonds purchased and sold by Clark L. Poole & Co. during the past eleven years $23,982,500 have matured to date and been paid, or called in prior to maturity at a premium.

We give below a COMPLETE tabulated record of ALL of our loans. The last two columns sum up the operation of the sinking fund—showing the percentage of the loan paid off as compared with the percentage of timber cut.

Names of Lumber and Timber Cos.	Total amount of issue.	Now outstanding.	Percentage of loan paid off.	X	Percentage of timber cut or released.
Hudson River Lbr. Co.$	560,000	None	100%		
King-Ryder Lbr. Co..	360,000	None	100%		
Rapides Lbr. Co.....	420,000	None	100%		
Lufkin Ld. & Lbr. Co.	600,000	None	100%		
Weed Lbr. Co. (1st issue)	550,000	None	100%		
C. A. Smith Timber Co. (1st issue).....	3,000,000	None	100%		
J. M. Thompson Lbr.Co.	600,000	None	100%		
Westmorel'd Lbr. Corp.	1,094,000	None	100%		
			Called in at 103 & interest & paid, before maturity		
Ky. & Tenn. Ry. Co.	716,500	None	Called in at 105.	100%	
Silverton Lbr. Co....	153,500	None	Called in at 102.	100%	
Wilson River T'ber Co.	900,000	None	Called in at 102½.	100%	
Camp & Hinton Co...	500,000	None	Matured and paid.	100%	
Scranton Lbr. Co....	1,000,000	None	Matured and paid.	100%	
Champion Lbr. Co....	2 500,000	$ 2,385,000	5%*		5%
Cheboygan Tbr. Co...	150,000	150,000	....		....
Consolidated Land Co.	1,000,000	600,000	40%		40%
C. D. Danaher Pine Co.	600,000	450,000	25%		13%
Delta L'd & T'ber Co.	4,000,000	3,896,000	2%†		3%
Dowling Lbr. Co.....	1,000,000	405,000	59%		29%
Elk Lbr. Co.....	383,000	383,000	....		....
Falls City Lbr. Co...	250,000	222,500	11%°		8%
Fidelity Lbr. Co.....	250,000	180,000	28%		14%
Fourche River Lbr. Co.	230,000	172,500	25%‡		19%
Fresno Flume & Lbr. Co.	1,235,000	1,146,000	7%		5%
Frost-Johnson Lbr. Co.	1,058,000	541,000	49%		No timber cut
Grandin Lbr. Co.....	1,600,000	1,600,000	....		....
Great So. Lbr. Co....	2,140,000	1,316,000	38%¶		15%
Hilton-Dodge Lbr. Co.	6,000,000	5,473,000	8%‖		5%
Jones-Wheeler Co....	300,000	300,000	....		....
F. P. Kellogg Lbr. Co.	250,000	250,000	....		....
Lagoon Lbr. Co.....	2,000,000	1,600,000	20%		No timber cut.
Long-Bell Lbr. Co....	9,000,000	4,557,500	49%		27%
Mendocino Redwood Co.	500,000	500,000	....		....
Metropolitan Redwood Lbr. Co.	310,000	290,000	6%		....
Miller & Vidor Lbr. Co.	375,000	275,000	27%**		19%
O. D. McHenry Lbr. Co.	150,000	65,000	57%		15%
A. J. Neimeyer Lbr. Co.	500,000	212,000	58%		42%
N.Y.& P. Redwood Co.	500,000	400,000	20%		9%
Nor. Redwood Lbr. Co.	1,900,000	1,900,000	....		....
Norton Lbr. Co.....	100,000	60,000	40%		No timber cut.
Ozan Lbr. Co.....	443,500	102,500	77%		61%
Pacific Lbr. Co.....	2,000,000	2,000,000	....		....
Parsons Pulp & Lbr.Co.	3,300,000	2,468,500	25%		13%
W. R. Pickering Lumber Co.	800,000	400,000	50%		35%
Pickering Ld. & Tim. Co.	1,027,000	927,000	10%		6%
Santiam Ld.& Tim. Co.	300,000	300,000	....		....
Savannah Timber Co.	179,000	150,000	16%††		13%
Silver Falls Tim. Co.	750,000	750,000	....§		less than ½%
C. A. Smith Tim. Co.	4,500,000	4,500,000	....		....
So. Pine Lbr. Co.....	750,000	200,000	73%		29%
Spokane Lumber Co..	500,000	425,000	15%		6%
Standard Lumber Co.	360,000	174,000	52%		29%
Storey Timber Co....	300,000	300,000	....		....
Temple Lumber	493,500	286,000	42%		13%
Tillamook Tim. & Log. Co.	3,100,000	3,100,000	....		....
Tremont Lumber Co.	2,500,000	1,450,000	42%		25%
Tidewater M. Co.....	350,000	350,000	....		....
Union Lumber Co...	3,000,000	3,000,000	....		....
Union Saw Mill Co..	368,000	128,000	66%		less than 1%
Weed Lumber Co....	1,200,000	850,000	29%		18%
Wendling Johnson Lumber Co.	1,177,000	1,177,000	....		....
Willapa Lumber Co..	750,000	750,000	....		....
Wind River Lbr. Co.	250,000	150,000	40%		1%
Yosemite Lumber Co.	3,450,000	3,333,000	3%		2%
	$80,583,000	$56,600,500			

*$107,368 in sinking fund to retire bonds—which will make 9% paid off.
† 148,700 in sinking fund to retire bonds—which will make 6% paid off.
° 6,445 in sinking fund to retire bonds—which will make 13% paid off.
‡ 12,140 in sinking fund to retire bonds—which will make 30% paid off.
¶ 57,595 in sinking fund to retire bonds—which will make 41% paid off.
** 25,307 in sinking fund to retire bonds—which will make 33% paid off.
†† 14,127 in sinking fund to retire bonds—which will make 24% paid off.
§ 11,872 in sinking fund to retire bonds—which will make 2% paid off.
‖In process of reorganization.

Note—Where no figures are shown in the last two columns showing percentages, no timber has been cut and no bonds matured.

WE DEAL EXCLUSIVELY IN TIMBER LAND BONDS

Circulars describing Four issues, the unsold portions of which we are now offering, to yield better than 6% per annum, will be sent upon application.

CLARK L. POOLE & CO.

TIMBER LAND BONDS

BANK FLOOR **WESTMINSTER BLDG., CHICAGO.**

Attention is called to the announcement on page 11

TIMBER
SECTION

The Pacific Lumber Company

Originally Organized February 24th, 1869

Paid-up Capital - - - $9,133,300.00 (Gold)

Largest Manufacturers of

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Correspondents in the principal cities of the world

Attention is called to the announcement on page 11

THE REDWOOD OF CALIFORNIA.

By Junius H. Browne.

The market for Redwood was for many years uncertain and limited, its sale depending chiefly upon the California demand. The development of the Eastern and foreign business was slow, because there was no direct rail connection with the Redwood country, it being necessary to bring all shipments into the harbors of San Francisco or Los Angeles for reshipment. The opening of the Panama Canal and the completion of the Northwestern Pacific Railroad into Humboldt County will mean much to the Redwood industry. With the canal will come the opportunity of marketing Redwood throughout the world in parcel lots of twenty-five, fifty, or one hundred thousand feet, where, heretofore, it has been necessary to sell in cargo lots of a million feet or more to obtain advantageous freight rates. Direct rail connection with the mills in Humboldt County will enable them to market a large quantity of by-products which are now burnt up or sold at cost locally.

The earliest logging of Redwood forests was by the Spaniards near San Francisco Bay, but their operations were very small. At the beginning of the nineteenth century, a Russian colony near Fort Ross in Mendocino County, cleared a tract of Redwood which has since grown up and again been cut over. It was not until 1850, however, that small sawmills were started at various points along the coast. There are now eighteen or twenty important mills in operation with a total annual output of 550 to 600,000,000 feet.

The biggest stands of Redwood timber are in Del Norte, Humboldt and Mendocino Counties, but there are isolated groups as far north as the Chetco River in Curry County, Ore., and as far south as the Santa Lucia Mountains, Monterey County. The Redwood belt is from twenty to forty miles wide, the trees growing on the west slopes of the coast range. The enormous size which Redwood attains is due to the heavy rainfall in the autumn and winter, (from thirty to sixty inches) and to the sea fogs which bathe the coast in the summer. On the slopes Redwood grows mixed with other woods such as Red Fir, Tan Bark Oak and White Fir. As the slopes become moderate, the altitude lower, the soil deeper and the water supply better, Redwood steadily gains on the other species until on the rich flats there is no other tree. The extreme form of the Redwood flat is along the Eel River, and here the trees reach their greatest known height and clear length. Under best conditions these trees grow to be 350 feet high with a diameter of 20 feet. Most of the Redwoods cut are from 400 to 800 years old. The oldest tree found during the Government investigation in 1900 was 1,373 years old. The normal tree has a straight, slightly tapered bole clear for more than 100 feet, and a crown of horizontal branches that may occupy from one-third to one-half of its total length.

The enemies of Redwood are few and it suffers from them less than other trees. The wind can scarcely uproot it, insects seem to do it little harm, and fungi seldom affect it. Fire occasionally kills whole stands of young Redwood growth, but is unable to penetrate the sheathing of shaggy bark with which the old trees protect themselves.

The yield of Redwood will average from 75,000 to 85,000 board-feet per acre, but some of the flat lands will show a stand of 1,000,000 feet or more to the acre. It is estimated that there is standing today about 75,000,000,000 feet of merchantable Redwood timber, so that, at the present rate of production, there is more than a century's supply in sight.

The value of the stumpage varies from $1.50 to $5.00 per thousand feet, depending upon the character of the timber and its location and accessibility. The flat timber is less expensive to log, and produces a greater percentage of upper grade lumber.

Redwood logging is expensive and difficult. The average cost is $5.00 to $6.00 per thousand feet. On the flat lands it will go as low as $3.00 per thousand. The greatest care must be taken by the choppers in felling a tree so that it will strike throughout most of its length at the same time, otherwise the wood will break and splinter badly. When felled, the tree is barked and cut into lengths from 16 to 40 feet. Skid roads are constructed over which the logs are hauled to the landings and loaded on cars by donkey engines, on their way to the sawmills.

The cost of converting Redwood logs into lumber is from $2.50 to $3.00 per thousand feet, this cost being increased because of the waste in manufacture, and because of the large amount of small sizes which the market calls for. Some logs are so large that they have to be split before the carriage will handle them in the mills. All machinery must be of the heaviest.

In this country Redwood is used very largely for exterior finish. It is particularly valuable for this sort of work because of its lasting qualities and its resistance to fire. Redwood contains a peculiar acid which preserves the wood. Many examples can be given of buildings sided with Redwood boards and covered with Redwood shingles that are today in firstclass condition after fifty or sixty years of continuous use without paint or treatment of any kind. Redwood contains no pitch, will not ignite easily, and burns very slowly. After the great San Francisco fire in April, 1906, the Building Committee appointed by the Mayor specified galvanized iron and redwood as the only materials from which temporary buildings might be erected without a permit.

The United States Government has compiled a list of woods designating the degree of inflammability by the position on the list. Redwood heads this list.

The better grades of Redwood are peculiarly fitted for the better class of interior finishing.

THE REDWOOD FOREST.

It has an effective natural grain, so that it is not necessary to select special pieces for finish. It is easily worked and takes a beautiful polish. When the wood is once properly dried, it will not shrink, swell, or crack. It is used for all kinds of exterior and interior work.

There are various kinds of special work to which this wood is especially adapted on account of its peculiar qualities, such as incubators, beehives, pattern stock, tank, pipe and silo staves, cores for veneer work, caskets and casket boxes.

The lower grades of Redwood are used for all kinds of foundation work, irrigation work, and for railway ties and tunnel timbers. Redwood is not only valuable for these purposes because of its durability and freedom from decay or rot, but also because it is not susceptible to the attacks of insects, such as the white ant, that destroy other woods.

Notwithstanding the handicaps that have existed in connection with the marketing of Redwood in the East, the present volume of Eastern shipments is now about 75,000,000 feet annually. This stock is distributed in practically every State, except those in the extreme south. While Redwood is extremely heavy when it is first cut, it dries out very light so that it may be advantageously shipped at high freight rates in competition with other woods. The foreign market takes even greater quantities of Redwood than the Eastern market. Australia and the United Kingdom are the largest consumers of the Upper grades, while the west coast of South America, India, China, the Philippine and Hawaiian Islands use quantities of Redwood ties. Smaller shipments of Redwood have been made to the east coast of South America, France, Germany and South Africa. Earlier shipments of Clear Redwood to Australia and Great Britain were largely heavy plank in the green state. Recently both of these countries have begun to realize the advantage of purchasing seasoned material in the sizes that are actually going to be used, and as many of the mills are now equipped to handle seasoned stock in large quantities, the volume of business has been considerably increased. Australia has already ordered 50,000,000 feet of Clear Redwood in 1914.

The problem of drying Redwood properly has been serious because of the large amount of moisture the wood contains. Earlier shipments of kiln-dried material did not give satisfaction because excessive or too rapid drying left the wood brittle and likely to split. Now the manufacturers realize that the best method of artificial drying is the one that approaches most nearly the natural air-drying, namely, a low heat with a big circulation of air to carry off the moisture.

The ability to furnish seasoned Redwood in large quantities will undoubtedly open new markets throughout the world, and with the improved conditions for marketing their products, the Redwood manufacturers are looking forward to a period of prosperity that will increase rapidly as the true worth of the wood is recognized in a greater degree.

PACIFIC COAST TIMBER

By G. X. Wendling.

The annual production of lumber is about forty billion (40,000,000,000) feet for the entire United States. Of this, the Pacific Coast now produces over one-fifth,—manufacturing about eight billion two hundred million (8,200,000,000) feet. That this total will be largely increased by the opening of the Panama Canal to commerce, is generally expected by well informed people. This belief is based on the fact that the rail freight on lumber from the Pacific to the Atlantic is approximately seventeen dollars per thousand feet, whereas it is stated by the steamship companies that the present tentative rate of thirteen dollars per thousand by the new water route will later be materially reduced. The present rail rate permits the shipment of only a small amount of the highest grades. A substantially lower rate will allow shipment of even the lowest grades.

If we accept the figures given in the report of the U. S. Commissioner of Corporations on the lumber industry published February 13, 1911, the duration of the business on the West Coast is based on a stand estimated at over fifteen hundred billion feet, distributed as follows:

Montana	65,600,000,000
Idaho	129,100,000,000
Washington	391,000,000,000
Oregon	545,800,000,000
California	381,400,000,000
Total	1,512,900,000,000

The length of time necessary to cut this supply will depend on future demand. From year to year, the consumption of lumber is increasing while the supply in the forests is not.

Heretofore, many people have hesitated to invest money in the securities of timber and lumber companies because ignorant writers and interested parties have spread the idea that twenty years cut would entirely obliterate the lumber industry. The business on the Pacific Coast has a good life before it and the present method of issuing serial bonds on timber properties, when bonds are protected by sinking funds collected as the timber is cut, makes timber investments on the Pacific Coast safe and profitable.

In earlier years, the fire hazard was viewed as a serious obstacle to investment in timber but the difficulty of protection from fire,—it may be said without fear of successful contradiction,—is no longer a serious matter, for, with the splendid forest protection systems now in operation, timber owners have the fire risk safely underwritten. That there may be, and no doubt will be, forest fires goes without saying, yet the risk of fire is down to a minimum and standing timber is as safe from fire as property in any of our Western cities. In some classes of timber, such as Redwood, there is no fire risk, and in others the danger is so slight as to be negligible from a practical viewpoint.

The value of merchantable stumpage on the Pacific Coast is governed largely by its accessibility and ease of operation. It must be within reach of transportation and it must be so situated that the cost of putting a road into it will not be a burden on future

operations. The nature of the country in which the timber grows should be favorable for logging and handling so as to enable the logger to get the logs to the main line of railroad, or to the mill, at a cost that will permit profitable operation.

Nearly all the timber on the West Coast is large and the logging equipment must be big and powerful. The logging cost varies in different localities, but, throughout the Coast, it usually runs from $4.50 to $7 per thousand feet, including the cost of building logging railroads. The construction of these roads may be estimated as costing about one dollar per thousand feet on an average operation.

In the region extending from California to British Columbia, and east to the Rocky mountains, grows the Douglas Fir or Oregon Pine. There are two forms of this tree known as "Yellow Fir" and "Red Fir." Sometimes both grades of lumber are cut from one tree but chiefly the trees of each form grow on different kind of ground. The "Yellow Fir" is found in thick forests on deep, moist soil and the "Red Fir" on the thinner soils with less moisture.

The wood of the "Yellow," which is softer than the "Red," is of a light yellow color. The wood of Douglas Fir is beautifully grained, has good tensile strength, and comes in long lengths. It is in demand for spars, bridges, and framing timbers. It is also adapted for flooring, inside finish, doors, and other building purposes. It is one of the most valuable all-purpose woods in North America. The size of the trees range from four to twelve feet in diameter and up to two hundred feet to the first limb. The stands of fir run from thirty thousand feet up to a hundred thousand feet per acre. The total stand on the Pacific Coast of the United States is approximately 640,000,000,000 feet, exceeding the stand of any other wood in that region.

A strip of territory along the Pacific Coast from California to Alaska, stretching out in places to a width of two hundred miles, produces one of the largest trees in the world, known as Menzies Spruce. This tree yields a wood that does not impart taste or odor, and makes an excellent container. It is also adapted to paper making, car siding, roofing and inside finish. Where soil and climatic conditions are favorable the tree grows rapidly and at times attains a diameter of seventeen feet and a height of two hundred and sixty feet. It is the next largest tree to the Redwood. The approximate stand in California, Oregon and Washington of Menzies or Tideland Spruce is 23,000,000,000 feet.

Through the Coast mountains and on the western slope of the Cascade range is found the Western Hemlock, which sometimes grows in almost pure stands. Its wood is free from pitch, of a light color and, when thoroughly seasoned, is a most valuable lumber. The name "Hemlock" was an unfortunate title for this valuable wood which resembles the Hemlock of the East only in such externals as the color and general appearance of its foliage. Owing to the prejudice against the inferior Eastern Hemlock, the Western Hemlock was at first sold under the names of "Alaska Pine," "Mountain Spruce," "Silver Fir," "Gray Fir," "Washington Pine," "Hemlock Larch," and other titles. However its native value and splendid possibilities have forced it into the favor of buyers and users, adjusted the misunderstanding of its qualities, permitted it to discard all disguises and enabled it to enter the mechanical field on a par with most other soft woods, and to sell under its own name. Much of the timely recognition of the superior qualities of Western Hemlock has resulted from the thorough tests carried on by the United States Forest Service at the University of Washington. These tests show conclusively that, while in its green state, it is, to a slight degree, inferior in strength to some other woods, its power of resisting rupture, crushing, and splitting is increased from 20% to 25% by seasoning. In the process of seasoning, it loses from 15% to 20% in weight and only 3% to 4% in volume. When dry, therefore, it compares favorably with any of the evergreens. Western Hemlock is practically free from "shake," differing greatly in this respect from the Northern and Eastern varieties. The tree is straight and tall, large in size, often growing to six and eight feet in diameter. The total quantity on the Pacific Coast of the United States is about 88,000,000,000 feet.

At altitudes of from two thousand to five thousand feet, on the Western slope of the Cascade mountains and also through the Coast Range, is found Larch or Noble Fir. The wood of this tree which is creamy white in color and is free from pitch or resinous matter. The fibre is soft, satiny, and susceptible of a high polish. The lumber is easily worked and valuable for inside finish. This tree attains a height of one hundred fifty to two hundred and eighty feet and a diameter of three to nine feet. The trunks are very erect and smooth, preserving a uniform diameter to a height of one hundred feet.

Along the western slopes of the Cascades and throughout the Coast Range grows the Western Red Cedar. Its heaviest stands are in the state of Washington where the abundant rainfall and other climatic factors fill its growing needs. Its reddish brown wood is soft, easily worked and very durable. Its wonderful lasting qualities under exposure have led to its use in large quantities for shingles. The state of Washington is the largest maker of shingles, producing about 85% of the total shingle output in the United States. The tree often attains a height of two hundred feet. Its average is more than one hundred feet. Diameter three to nine feet. Sometimes trees are found having diameters of fifteen feet. The exact quantity of this timber is not known, but there is a good supply.

In the Coos Bay region, in the southwestern part of Oregon, is found the most valuable species of cedar in the state, known as Port Orford, or White Cedar, The yellowish wood of this tree is very durable, easily worked, takes a high polish and contains a large quantity of resin. The odor from the resin is supposed to be offensive to insects, and for this reason the wood is used in large quantities in the manufacture of cedar chests for the protection of all kinds of cloth and fur clothes. The oil of the resin prevents decay, and the wood is extensively used in shipbuilding. The trees grow as high as two hundred feet and have diameters from three up to ten feet, but the latter size is rarely found. The

stands of this timber run about twenty thousand feet per acre and in isolated cases as high as one hundred thousand feet. The total quantity of Port Orford Cedar is supposed to be about 5,000,000,000 feet.

Sugar and White Pine grow along the western slopes of the Cascade and Sierra mountains from Central Oregon to Central California. The trees flourish at elevations of fifteen hundred to seven thousand feet, but the choicest growth is found between three thousand and fifty five hundred feet above sea level. The trees grow in a mixed forest carrying about an equal quantity of Sugar and White Pine and, generally, other woods such as White and Red Fir. It is a common remark among California lumbermen that our forests run about one-third Sugar Pine, one-third White Pine and one-third White and Red Fir, with some Incense Cedar. Sugar and White Pine are useful mainly for general building lumber. They make a beautiful house finish and trim, possess exceptional value for doors, windows, blinds. As a veneer material, they have no superior in soft woods, as they are entirely free from face checking. For the manufacture of box shooks, these woods are truly wonderful because the White and Sugar Pine shooks, when ready for use may be shipped to any climate without checking. In California the fruit products are, in the main, packed in White and Sugar Pine boxes. The consumption of raw material for this purpose reaches the generous total of about two hundred million feet annually. When thoroughly seasoned, Sugar Pine is not subject to expansion or contraction and, therefore, is superior to all known soft woods for making piano keys and pattern materials. The wood of Sugar and White Pine, which is soft and creamy white, is used for the same purposes as the White Pines of Michigan, Wisconsin and Minnesota. The trees grow up to twelve feet in diameter, and reach a height of two hundred and fifty feet. The total quantity of these woods in California is about 306,000,000,000 feet.

PARTIAL VIEW OF A LUMBER MILLING OPERATION IN WASHINGTON.

TIMBER BONDS.

Features Deserving Consideration.

By T. S. McGrath.

The timber bond issue should be, and generally is, a first mortgage on all the property of the company, but the real security on which the issue is based is the green and growing timber.

The margin of safety, as regards principle, is easily determined and is generally ample. Timber is a staple and its products have an established market. The industry pays vast sums to the people in the form of wages, to the governments as taxes, to transportation companies for carrying charges, to mill, foundries and supply houses for equipment. The quantity and quality of stumpage on a given area can be examined, estimated, graded and valued with a great degree of accuracy, and its loan value definitely determined. Timber differs from coal and iron which, once mined, can never be replaced. Timber is a crop, and with care in cutting and some attention to the logged-off land, it will again produce a forest in a reasonable time. When accurately estimated and properly appraised, it is a sound security for loans and a profitable investment, which contains certain basic features of safety not always to be found combined in other classes of collateral.

Defaults which occur in timber bond issues do not always come about through insufficient collateral security. Frequently they are caused by unwise provisions in the trust deed regarding sinking fund requirements and serial maturities.

As timber is cut and removed from the land, a sinking fund of a certain sum per thousand feet is paid to the trustee for the retirement of the principal, which is usually represented by serial bonds, maturing at specified intervals. This sinking fund should not be applied to the payment of interest.

The heavy cost of building present day mills and constructing railways, make it necessary to provide a supply of timber that will furnish raw material for many years. This involves a large initial investment. This timber can only be cut at a certain rate per month, and the bonds are made retirable every six months in amounts based on the capacity of the mill and the amount to be paid into the sinking fund. The interval allowed before the first serial maturity is a very serious matter. In many instances this interval is too short, and the necessity of meeting a large payment after only a brief period of operation is too great a burden. To provide for early maturities it is necessary to create heavy sinking fund payments, and these factors constitute a serious danger. This danger is sometimes overlooked or ignored by underwriters because it is easy, in many instances, to sell early maturities, and it has been easier to sell all the maturities if they had a brief life than if they ran for a long period.

Buyers of timber bonds have become alive to these dangers and it is safe to say that, henceforth, the amount paid to the sinking fund will be reduced to a minimum, the first maturity postponed for a safe number of years, the serial payment made as small as possible, and the life of the loan extended over the longest permissible period. Provisions regarding these matters must necessarily be regulated according to the particular property under consideration, but safety demands their careful adjustment.

The amount and kind of timber on a given area, and the cost of manufacturing it determines the loan value or the purchase price of timber land.

The quantity and quality of timber is determined by an examination of the land known as "cruise." The cruiser should estimate the amount of each kind and grade of timber on the tract. When timber was very cheap a "rule of thumb" method of doing this was sufficiently accurate. In the old days there were no bonds outstanding against the timber and an owner could cruise to suit himself. Today, however, the value of timber land has increased to such an extent that "rule of thumb" estimating should no longer be countenanced. There is no reason why a cruiser should be permitted to place the loan value on the timber, to estimate the logging cost, to lay out the probable railway line, to guess the milling cost, and to appraise mill value. The values should be figured by an expert; the logging cost should be determined by a logging engineer; the railway should be laid out by a civil engineer; the milling cost should be worked out by a millman who is perfectly familiar with the particular kind of timber to be manufactured. All these estimates and reports, including the legal opinion of the titles, should be correlated by a capable man, and the loan viewed and and analyzed as a whole. There are many able cruising engineers whose men are educated, experienced and capable. There is, therefore, no excuse for the continuance of the antiquated and dangerous methods. The mistakes made through employing them are rarely discovered soon enough to prevent trouble.

Recently some cruising firms have been prone to over-estimate the quantity and quality of timber on a tract. This class of cruiser estimates everything that could be profitably taken out in the highest lumber market; and, occasionally, much more. When prices are normal it is impossible for the operator to get as much timber off the land at a profit as such a cruiser estimated, and when prices are low the shortage from the cruise is very heavy. The lumberman cannot get cost out of low grade logs or tops, and must leave them in the woods unless lumber prices are high. Thus the supposed security of the bond holder shrinks. Should the operator fail, the hope of the bond holder is in the timber, and if this timber is estimated to show twenty to fifty per cent more on the land than really exists in commercial grades, the bonds may not pay out after deducting court fees, receiver's charges and other expenses incident to foreclosure.

There are tracts of timber now under offer in this country and Europe where the cruises have been lifted fifty per cent and the values over one hundred per cent. Such tracts have been sold

here and abroad during the past six years. Bond buyers should scrupulously guard against excess cruises and valuations by purchasing their bonds through conservative houses and banks.

Over-production has always been the bane of the lumber business. In early days the ease of entering the trade and the profits to be derived, in good years, from sawing logs, caused numbers of small mills to spring up through the timber states. These mills butchered the log as well as the price, and finally raised the production of lumber far beyond the consumption. When this stage was reached the lumber buyer found himself in a position to insist that proper grades and kinds of lumber be delivered on his orders. He also insisted on careful sawing, even widths, uniform thickness and merchantable quality. These demands the small mills that were only designed to rip the log and butcher the board could not meet, and they gradually ceased to exist. They were succeeded by larger mills, and in recent years, these, in turn have been improved, or replaced by large band mills that operate with wonderful economy and efficiency. The purpose of the timber bond should be to secure for the existing mills the necessary lands to keep them running and to add the latest improvements as they are perfected and to provide capital for such new enterprises as rigid investigation shows are fully warranted. Bond buyers should learn to recognize promotion enterprises however skillfully disguised, and avoid purchase of their securities.

The purchaser of the bonds of public utility or industrial companies insists on the highest operating efficiency in the active management of the company whose securities he holds. The holder of the timber bond, who provides the operating capital, is entitled to the same consideration from the lumber mill man, yet, if the situation is carefully analyzed, he finds that there is a wide difference between the methods of lumber manufacturers and those of the manufacturers of many other staple commodities.

The bond holder is supposedly secured by the entire contents of the tree, but he finds that only that portion of sufficiently high quality to permit of its being profitably manufactured into lumber, is taken out of the forest. The remainder of the tree is wasted. He finds that the parts of the tree now discarded could be converted into marketable products, but that the skill for doing this in commercial quantities is lacking. While he holds the entire tree as security for his bonds he accepts a small portion of it as payment, which is bad practice if his bond has a long life. A large quantity of the timber content of every tree is wasted. Extension of the uses of the volume of the tree and improvements in the manufacture of wood products have not kept pace with the improvements in the other industries of this country.

We have heard a great deal about conservation of our timber resources. True conservation should look to the recovery of the entire merchantable content of the tree—the extraction of all of the wealth that the tree contains, whether in lumber or other products. The so called "conservationists" have preached the non-cutting of trees and the non-use of the forest areas. This theory that non-use is conservation is a fallacy that must inevitably be superseded by the practice of complete utilization.

It is a waste of energy to say that trees in the forest must not be cut, but allowed to die of old age and rot. The over ripe trees make poor lumber, are always in danger of being blown down by the wind, clutter the land and occupy the space that should be devoted to green and growing and living timber. *Every tree must die and fall.* Permitting them to stand until they are downed by decay makes them unfit for lumber, removes that much material from the market and raises the price of wood products.

The Bureau of Forestry is not giving the attention and aggressive interest to furthering the uses of the entire tree that the importance of such work demands. The country is in greater need of experts in the manufacture of wood products than in the policing of tracts of growing timber. Trees are a natural crop and if given the right chance will reproduce themselves, but it takes brains, skill and energy to manufacture them into finished materials. We need schools for teaching, and experiment stations and men for directing the utilization of the entire content of a tree, far more than we need instructions on how to grow a tree. Even under the present crude methods of manufacture we have enough timber to last a very long time, and if complete use of the tree was established our timber resources could be very conservatively figured as perpetual. The Bureau of Forestry is the arm of the Government that should bear the brunt of working out new uses for wood products. The industry is still in its infancy and the present methods so crude and backward that a large part of every tree is wasted. There is today a demand for many products that can be made from this waste. This demand was not recognized a generation ago or the lumber men of that day would have found the means to meet it by utilizing the parts of the tree not now used for naval stores, lumber, lath or shingles.

The next step forward in the timber industry should be the addition to the present plants of units for making by-products from all parts now wasted, thus making them complete factories—factories that will convert every part of the tree into useful articles of commerce. This step will be taken and these complete factories for making wood products will come into existence. The possibilities for development in the making of wood products are immense and it is time this large industry was freed from its handicaps and oppressions and permitted to develop into the great institution it is destined to become.

Attention is called to the announcement on page 11

STATE AND
CITY
SECTION

Debts and Resources
of
States, Cities and Towns
in the
Pacific Coast States

STATE OF CALIFORNIA.
ITS
DEBT, RESOURCES, &c.

Admitted as a State (Act of Sept. 9, 1850)....Sept. 9, 1850
Total area of State (square miles)..... 158,297
State Capital .....Sacramento
Governor (term expires 1st Monday after January 1, 1915).....Hiram W. Johnson
Secretary of State (term expires 1st Monday after January 1, 1915).....Frank C. Jordan
Treasurer (term expires 1st Monday after January 1, 1915).....Edw. D. Roberts

LEGISLATURE meets biennially in odd years on the first Monday after January 1, and sessions are not limited, though members receive only $1,000 for each regular session and $10 for each day while in special session.

HISTORY OF DEBT.—Commercial and Financial Chronicle.—For early history of the State debt, see "State and City Section" of April, 1894, page 142.

Civil War Bonds of 1857.	**Harbor-Improvement Bonds.**
Int. ceased $3,500c.....	4s g '11 J-J $8,298,000c. July 2, 1985
Civil War Bonds of 1860.	(Subject to call after July 2, 1950.)
Int. ceased $500c.....	**Highway Bonds.**
Funded Debt Bonds.	$5,200,000c. July 3, '17-'29
6s g '73 J-J $2,277,500c (*)	1,600,000c. July 3, '30-'33
Sea Wall Bonds.	4s'11 J-J 200,000c. July 3, 1934
4s '05 J-J $2,000,000c. Jan. 2, 1924	3,000,000c. July 3, '35-'41
(Subject to call after Jan. 2, 1914.)	3,000,000c. July 3, '42-'49

*Of which $1,526,500 held by State School Fund and $751,000 by University fund.

INTEREST is payable at the office of the Treasurer in Sacramento, and Bankers Trust Co., New York City.

TOTAL DEBT.—The total bonded debt of the State Sept. 1, 1914, was $25,579,500, including $4,000 civil bonds on which int. has ceased. The warrant debt on that date was $334,465.20. Cash in treasury on March, 20, 1914, amounted to $22,545,783.09. The $2,000,000 sea wall bonds issued for San Francisco are not included in the total indebtedness of the State; these bonds are payable out of a sinking fund receiving its revenue from moneys collected by the San Francisco Harbor Commissioners.

The bonds of 1873 ($2,277,500) matured in 1893. No sinking fund having been provided for their payment, they were taken over by the State for its school funds and have been so held since 1893.

The State Treasurer on Sept. 1, 1914, held bonds aggregating $7,563,375 for the benefit of the State School Fund; this includes $1,526,500 of the funded debt bonds of 1873. The State Treasurer also holds $3,234,125 for the benefit of State funds other than the School Fund. This includes $751,000 of the funded debt bonds of 1873 held in trust for the University Fund referred to above.

ASSESSED VALUATION.—The following statement shows the total assessed valuation and the tax rate (per $1,000) for the years indicated.—decrease in 1906 caused by destruction of property by earthquake.

Years.	Valuation.	Tax rate.	Years.	Valuation.	Tax rate.
1914.....	$3,202,450,546	.....	1902.....	$1,290,238,964	$3.82
1913.....	3,114,136,640	.....	1900.....	1,217,648,863	4.98
1912.....	2,920,400,512	*None	1890.....	1,101,137,290	5.80
1910.....	2,471,505,410	$3.53	1880.....	666,399,985	6.40
1908.....	1,991,554,603	4.00	1870.....	277,538,134	8.65
1906.....	1,595,897,411	4.76	1860.....	148,193,540	6.00
1904.....	1,545,698,785	5.35	1850.....	57,670,689	5.00

*Pursuant to Chap. 335, Laws of 1911, carrying into effect Sec. 14 of Art. 13 of the constitution as amended Nov. 8, 1910 (see below) there is now no general tax, revenue being derived from the taxation of public service and other corporations, banks and insurance companies. The amount of tax placed upon these corporations by the State Board of Equalization for 1911 was $10,454,125.46; 1912, $10,922,405.72; 1913, $12,971,541.80; and 1914, $13,580,773.44.

CONSTITUTIONAL AMENDMENTS.—Pursuant to a constitutional amendment adopted Nov. 8, 1910, the city of San Francisco voted and issued $5,000,000 bonds, the proceeds to be used by the Panama Pacific International Exposition Co. for an exposition to be held in San Francisco to celebrate the opening of the Panama Canal. Another amendment, approved on Nov. 8, 1910, creates a State fund of $5,000,000 for the use, establishment, maintenance and support of the Panama Pacific International Exposition. Still another amendment adopted provides for the separation of State and local taxation and for the taxation of public service and other corporations for the benefit of the State. On Oct. 10, 1911, the voters adopted constitutional amendments granting equal suffrage to women, allowing the recall of public officials, even the judiciary, and reserving to the people the powers of initiative and referendum.

BOND PROPOSITIONS.—Propositions providing for the issuance of $18,000,000 highway, $1,500,000 San Diego sea-wall, $1,000,000 India Basin and $9,000,000 harbor-improvement 4% bonds for the city and county of San Francisco were adopted at the general election on Nov. 8, 1910. This latter issue was declared valid by Superior Judge Seawell on Feb. 2, 1914. On May 23, 1912, Judge Seawell dismissed an order to show cause why an injunction should not be issued restraining the sale of the $1,000,000 4% India Basin bonds. The offering of these bonds, which was to have taken place July 22, 1912, was indefinitely postponed.

DEBT LIMITATION.—The limitations fixed in the constitution of California with reference to the creation of State debt, debts of counties, cities, towns, etc., are as follows:

ARTICLE 16. Section 1.—*State Indebtedness.*—The Legislature shall not in any manner create any debt or debts, liability or liabilities, which shall, singly or in aggregate with any previous debts or liabilities, exceed the sum of three hundred thousand dollars, except in case of war to repel invasion or suppress insurrection, unless the same shall be authorized by law for some single object or work to be distinctly specified therein, which law shall provide ways and means, exclusive of loans, for the payment of the interest of such debt or liability as it falls due, and also to pay and discharge the principal of such debt or liability within seventy-five years of the time of the contracting thereof, and shall be irrepealable until the principal and interest thereon shall be paid and discharged, and such law may make provision for a sinking fund to pay the principal of such debt or liability to commence at a time after the incurring of such debt or liability of not more than a period of one-fourth of the time of maturity of such debt or liability; but no such law shall take effect until, at a general election, it shall have been submitted to the people and shall have received a majority of all the votes cast for and against it at such election; and all moneys raised by authority of such law shall be applied only to the specific object therein stated, or to the payment of the debt thereby created, and such law shall be published in at least one newspaper in each county, or city and county, if one be published therein, throughout the State, for three months next preceding the election at which it is submitted to the people. The Legislaure may at any time after the approval of such law by the people, if no debt shall have been contracted in pursuance thereof, repeal the same.

ARTICLE 12. Section 13.—*State Not to Loan Its Credit, &c.*—The State shall not, in any manner, loan its credit, nor shall it subscribe to or be interested in the stock of any company, association or corporation.

ARTICLE 4. Section 31.—*Legislature Prohibited from Loaning Credit, &c., of State, City, County, &c.*—The Legislature shall have no power to give or to lend, or to authorize the giving or lending of, the credit of the State, or of any county, city and county, city, township or other political corporation or sub-division of the State now existing, or that may be hereafter established, in aid of or to any person, association or corporation, whether municipal or otherwise, or to pledge the credit thereof in any manner whatever for the payment of the liabilities of any individual, association, municipal or other corporation whatever; nor shall it have power to make any gift, or authorize the making of any gift, or any public money or thing of value to any individual, municipal or other corporation whatever; *provided*, that nothing in this section shall prevent the Legislature granting aid pursuant to *section twenty-two* of this Article; and it shall not have the power to authorize the State or any political sub-division thereof to subscribe for stock or to become a stockholder in any corporation whatever.

The exception provided in Section 22 of Article 4 (refererd to in the last clause of the above) permits merely the granting of aid by the State and by cities, &c., to institutions for the support and maintenance of minor orphans, or half-orphans, or abandoned children, or aged persons in indigent circumstances. By an amendment adopted Nov. 8, 1910, further provision is made for creating a fund of $5,000,000 for the use, establishment, maintenance and support of the Panama Pacific International Exposition. See constitutional amendments given in preceding column.

ARTICLE 11. Section 18.—*Counties, Cities and Towns, &c., Debt Restrictions.*—No county, city, town, township, board of education or school district shall incur any indebtedness or liability, in any manner, or for any purpose, exceeding in any year the income and revenue provided for it for such year, without the assent of two-thirds of the qualified electors thereof voting at an election to be held for that purpose, nor unless, before or at the time of incurring such indebtedness, provision shall be made for the collection of an annual tax sufficient to pay the interest on such indebtedness as it falls due, and also provision to constitute a sinking fund for the payment of the principal thereof on or before maturity, which shall not exceed *forty years* from the time of contracting the same; *provided, however*, that the City and County of San Francisco may at any time pay the unpaid claims, with interest thereon at the rate of five per cent per annum, for materials furnished to and work done for said city and county during the forty-first, forty-second, forty-third, forty-fourth and fiftieth fiscal years, and for unpaid teachers' salaries for the fiftieth fiscal year, out of the income and revenue of any succeeding year or years, the amount to be paid in full of said claims not to exceed in the aggregate the sum of five hundred thousand dollars, and that no statute of limitations shall apply in any manner to these claims; *and provided, further*, that the City of Vallejo, of Solano County, may pay its existing indebtedness incurred in the construction of its water-works whenever two-thirds of the electors thereof voting at an election held for that purpose shall so decide, and that no statute of limitations shall apply in any manner. Any indebtedness or liability incurred contrary to this provision, with the exceptions hereinbefore recited shall be void.

The City and County of San Francisco, the City of San Jose and the Town of Santa Clara may make provision for a sinking fund, to pay the principal of any indebtedness incurred, or to be hereafter incurred, by it, to commence at a time after the incurring of such indebtedness of not more than a period of one-fourth of the time of maturity of such indebtedness, which shall not exceed seventy-five years from the time of contracting the same. Any indebtedness incurred contrary to any provision of this section shall be void.

COUNTY DEBT RESTRICTIONS.—By a State law passed March 24, 1893, all counties are restricted to the issuance of bonds running not longer than *twenty* years.

A new law regulating indebtedness for public improvements was enacted in 1901. Section 4 of this law establishes a limit for such indebtedness, and is as follows:

LIMIT OF INDEBTEDNESS.

SECTION 4. No city, town or municipal corporation shall incur an indebtedness for public improvements which shall in the aggregate exceed 15% of the assessed value of all the real and personal property of such city, town or municipal corporation.

TAX EXEMPT AMENDMENT.—At the November 1902 election the followig amendment to Article 13 of the State constitution was favorably voted upon.

SECTION 1¾. All bonds hereafter issued by the State of California, or by any county, city and county, municipal corporation, or district (including school, reclamation and irrigation districts) within said State shall be free and exempt from taxation.

MORTGAGES EXEMPT FROM TAXATION.—Among the amendments voted Nov. 8, 1910, is one repealing Section 4 of Article 13 of the State constitution, changing Section 1 so that hereafter a mortgage deed of trust, &c., together with the money represented by such debt, shall be exempt from taxation.

IRRIGATION BONDS AS SAVINGS BANK INVESTMENTS.—The Legislature in 1911 passed an Act (Chapter 157, Laws 1911) allowing investment by savings banks in bonds of irrigation districts.

POPULATION OF STATE.—

1910....2,377,549	1890....1,208,130	1870.....560,247	1850.....92,597
1900....1,485,053	1880.... 864,694	1860.....379,994	

The number of Chinese in the population in 1900 was 45,753, 72,742 in 1890 and 75,132 in 1880.

CITIES, COUNTIES AND TOWNS IN THE STATE OF CALIFORNIA.

Many of the counties in this State levy a special tax on property outside incorporated cities and towns for making, repairing and sprinkling of roads, and the tax rate as given below under these counties is made up of the State tax rate and the county tax rate *including* special road tax.

(Compiled by the Commercial and Financial Chronicle.)

ALAMEDA.

This city is in Alameda County. City was incorporated 1854; re-incorporated 1872. Special charter adopted April, 1907. For proposed purchase of certain water properties, Population 1910, 23,382.

City Hall.
5s '94 J-D $ 26,250c.....Dec 1 '14-'34
School.
5s '94 J-D $ 21,525c.....Dec 1 '14-'34
4s '01 J-D 70,000c.....Dec 1 '14-'41
4½s '10 J-D 135,600.....June 1 '15-'50
Municipal Improvement Bonds.
4½s '08 A-O $259,250c.....Apr 1 '15-'48
Electric Light & Police Department Bonds.
5s '12 M-N $150,100.....Nov 1 '15-'52
Sewer Bonds.
4½s '10 J-D $26,400.....June 1 '15-'50
BOND DEBT Apr 1914.....$693,075
Assessed valuation '13 (65% act.)..$20,971,561
City tax rate (per $1,000) '13.....$10.30
INTEREST payable at City Treas. office.

ALAMEDA CO. UN. H. S. D. NO. 3.

Building Bonds.
5s g '12 J-D $80,000c.....June 1 '18-'47
BONDED DEBT Nov 1913.....$ 80,000
Assessed valuation '12 (3-5 act).... 7,449,900
Population in 1912 (estimated).....5,000
INTEREST payable at County Treasurer's office in Oakland.

ALAMEDA CO. UN. H. S. D. NO. 4.

High-School Building Bonds.
5s '06 J-J $79,858.....1914-1926
Assessed valuation '12 (3-5 act)..$17,490,027
INTEREST at County Treasurer's office.

ARMIJO UNION HIGH S. D.

A district in Solano County.
Building Bonds (Tax-free).
5s '13 J-J $70,000c.....July 1 '14-'49
BONDED DEBT Mar 1914.....$ 70,000
Assessed valuation '13 (60% act.).. 4,272,867
School tax (per $1,000) 1913..... 3.80
Population in 1914 (estimated).....4,380
INTEREST at Treasurer's office.

BAKERSFIELD.

This city is in Kern County. Incorporated Jan. 11, 1898. Town of Kern annexed July 19, 1910. Population 1910 12,729.

Improvement Bonds.
4s '04.....$23,000c.....Pt yly July 1
Fire-Department Bonds.
5s '12 A-O $57,000.....Oct 1 '15-'52
Library Bonds.
5s '12 A-O $26,650.....Oct 1 '15-'52
Sewer Bonds.
4½sg '07 M-N $ 99,000.....May 1 '15-'47
5s '12 A-O 204,225.....Oct 1 '15-'52
5s '12 .... 15,200.....Oct 1 '15-'52
City-Hall Bonds.
5s '12 A-O $145,875.....Oct 1 '15-'52
School Bonds.
4½s .....$30,000.....Part yly July 1
BONDED DEBT Mar 1914.....$ 606,425
Assessed valuation '13 (½ act.).... 7,885,000
Total tax (per $1,000) 1913..... 19.00
INTEREST payable at City Treas. office.

BAKERSFIELD SCHOOL DISTRICT.

Building Bonds.
5½s '14 .....$40,000.....1918-1927
BONDED DEBT July 1914.....$ 231,000
Assessed val. '13 (abt 3/5 act.).... 8,852,594

BERKELEY.

This city is in Alameda County. Incorporated April, 1878. New charter adopted March 5, 1895. Commission government adopted July 1, 1909.

Sewer and Fire Equipment.
5s '13 J-J $555,000c.....July 15-'51
School Bonds.
4½s '00 J-J $65,000c.....July 10 '15-'40
Munic. Improvement Bonds (Tax exempt).
4½s'g F-A $245,932.50.....Feb 1 '15-'47
BONDED DEBT Sept 21, '14....$ 865,933
Sinking funds 5,938
Assessed valuation '14-'15..... 42,706,510
Total tax (per $1,000) '12-'13..... 24.10
Population in 1910 (Census).....40,434
INTEREST on fire-equipment and sewer bonds at office of City Treasurer or at N. W. Halsey & Co., N. Y.; other bonds at City Treasurer's office.

BERKELEY SCHOOL DISTRICT.

4½s '06 J. J. $118,500.....
4½s '07 J. J. 186,750.....
4½s '07 J. J. 82,450.....
4½s '08 J. J. 175,000.....
BONDED DEBT June 30 '14.....$562,700
INTEREST payable at County Treasurer's office.

BRAWLEY UNION HIGH S. D.

A district in Imperial County.
5s '13.....$50,000.....1933
TOTAL DEBT Oct 14 '14.....$ 50,000
Assessed valuation '14..... 4,286,669
School tax rate (per $1,000) '14..... 6.00

CENTRAL UNION HIGH S. D.

A district (P. O. El Centro) in Imperial County. Population '14 (estimated) 8,000.

Building Bonds.
5s '11 J-J $75,000.....1927-1951
7s J-J 15,000r.....1914-1919
BONDED DEBT Oct. '14.....$ 90,000
Sinking fund Mar. 24 '14..... 10,000
Assessed valuation '13 (3-5 act.)... 6,500,000
High-school tax (per $1,000) '14.... 3.40
INTEREST payable at County Treas. office.

CHAFFEE UN. HIGH SCHOOL DIST.

A district in San Bernardino County.
Building Bonds.
5s g '11 Sept $100,000.....Sept 11 '17-'51
5s g '11 Sept 100,000.....Sept 1 '20-'51
BONDED DEBT Mar 1913.....$ 200,000
Assessed valuation 1912..... 5,458,439
Real valuation (estimated)..... 12,000,000
INTEREST at County Treas. office.

CHICO.

This city is in Butte County.
Sewer Bonds.
5s '02 J-J $31,500c.....Jan 1 '15-'42
Municipal Improvement Bonds.
5s '10 J-J $138,750c.....July 1 '14-'50
BONDED DEBT Oct 31 '13.....$ 171,375
Assessed valuation '13..... 3,004,003
Tax rate (per $1,000) '12-'13..... 15.50
Population in 1910 3,750
INTEREST at office of City Treasurer.

CHICO GRAMMAR SCHOOL DIST.

4s .....$5,000.....
Building Bonds.
5s '13 .....$47,000.....1915-1938
TOTAL DEBT Sept '14..... $57,500
Assessed valuation '13 (¼ act.).....5,130,000
Population in 1914 (est.).....14,000

COLTON

This city is in San Bernardino County.
Water Bonds.
6s '85 J-J $33,600c.....1925
6s '99 J-J 12,500c.....1939
Electric-Light Bonds.
6s '96 J-J $3,300c.....1936
Refunding Bonds.
6s '01 J-J $3,800c.....1941
Sewer Bonds.
5s '10 J-J $57,000c.....1941
BONDED DEBT Apr 22 '14.....$ 110,200
Assessed valuation '13-'14 (½ act) 2,105,965
Value of corporative and operative property (additional)..... 695,610
Total tax rate (per $1,000) '13.... 33.35
Population in 1910 (Census).....4,852
INTEREST payable at First Nat. Bank, Colton, or at Colton Nat. Bank.

COLUSA COUNTY.

Colusa is the county seat.
Hall of Records Bonds.
5s g '14 J-D $60,000c.....yly on June 15
Bridge and Culverts Bonds.
5s g '14 J-D $140,000c.....yly on June 15
BONDED DEBT Apr '14.....$ 452,000
Assessed valuation..... 14,150,781
Population in 1910.....7,732

CONTRA COSTA COUNTY.

Martinez is the county seat. Bonds are tax-exempt. Population, 1910, 31,674.

Court-House and Jail Bonds.
4s g '03 J-J $161,000c.....1943
BONDED DEBT May 1 '14.....$ 161,000
Assessed valuation '13 (½ act.).. 47,731,341
State & County tax (Inside 12.00
(per 1,000 1913 (Outside.... 16.00
INTEREST payable at County Treasury.

CORONA.

This city is in Riverside County. Incorporated July 19, 1896. Population, 1910, 3,550.

Sewer Bonds.
5s g '09 A-O $26,250c.....Aug 1 '15-'49
Street Bonds.
5s g '09 A-O $ 12,687.50c.....Aug 1 '15-'49
5s g '12 .... 130,625c .....Jan 1 '15-'52
Drainage Bonds.
5s g '09 A-O $79,625c.....Aug 1 '15-'49
Municipal Improvement Bonds.
4½s & 5½s '11 $95,950.....1915-1952
BONDED DEBT Sept 1 '14.....$ 249,188
Assessed valuation '14 (2-5 act.).... 4,021,500
Total tax rate (per $1,000) '14.... 38.60
INTEREST payable at City Treas. office.

CORONADO.

This city is in San Diego County. Incorporated 1890. Population, 1910, 1,477.

Seawall Bonds.
F-A $108,000.....
Seawall and Street Improvement.
A-O $143,000.....
Sewer and Fire Improvement.
F-A $42,550.....
BONDED DEBT Apr '14.....$ 293,500
Assessed valuation '14 (½ act.).... 3,372,276
City tax rate (per $1,000) '14.... 18.70
INTEREST Payable at City Treas. office.

CORONADO SCHOOL DISTRICT.

Building Bonds.
5s '12 July $80,000c.....1915-1934
BONDED DEBT Sept 1 '14..... 80,000
Sinking fund 7,516
Assessed val. '14 (abt. 35% act.). 2,461,861
School tax rate (per $1,000 '14)... 13.80
Population in 1914 (estimated).....4,500
INTEREST at County Treasurer's office.

DIXON.

This town is in Solann County. Incorporated in 1878; re-incorporated in 1884. Population, 10,827.

Sewer Bonds (tax free).
5s '11 J-D $38,000.....$1,000 yearly
BONDED DEBT Mar 1 '14.....$ 38,000
Assessed valuation '13 (½ act.).... 625,750
City tax rate (per $1,000) '13..... 13.50
INTEREST payable at Bank of Dixon.

EL CENTRO.

This city is in Imperial County. Incorporated April 16, 1908.

Municipal Improvement Bonds.
5½s J-J $50,000c.....July 2 '23-'42
BONDED DEBT Sept 21 '14.....$ 149,000
Assessed valuation '14 (¾ act.).... 3,404,815
City tax rate (per $1,000) '14..... 13.60
Population in 1910..... 1,610

EL CENTRO SCHOOL DISTRICT.

6s g '13 J-D $30,000.....1918-1947
TOT. BONDED DEBT Jan 1 '14..$ 149,000
Assessed valuation '13 (½ act.).... 2,308,919

EL DORADO COUNTY.

Placerville is the county seat.
Court-House Bonds.
5s ann $120,000.....1946
(Maturity 1-30 yearly after 5th year.)
BONDED DEBT Mar '14.....$ 120,000
Assessed valuation 1913..... 6,954,117
State & Co. tax rate (Inside 17.00
(per $1,000) 1913... (Outside ... 21.00
Population in 1910 7,492
INTEREST payable at County Treas. office.

EUREKA.

This city is in Humboldt County. Incorporated Feb. 10, 1874. All bonds are exempt from taxation. Commission government defeated Dec. 4, 1911. Population, 1910, 11,845.

*City Hall Bonds.
4½s semi-an $77,500c.....
*Sewer Completion Bonds.
4½s semi-an *$27,125c.....
4½s semi-an $61,625c.....
*Fire Apparatus Bonds.
4½s semi-an $11,625c.....
*Park Bonds.
4½s semi-an $3,875c.....
§Third Ward School Bonds.
4½s semi-an $10,875c.....
Fifth Ward School Bonds.
4½s semi-an $10,875c.....
*Part yearly on July 15. §Part yearly April 15.

Water Works Bonds.
5s '14 J-J $270,000.....July 15 '24-'53
BONDED DEBT Mar 20 '14.....$ 203,500
Assessed valuation '13 (2-5 act.)..x8,889,076
Total tax (per $1,000) '13..... 30.70
x Including $712,839 operating property taxed only by State.
INTEREST payable at City Treas. office.

EUREKA HIGH SCHOOL DIST.

Building Bonds.
5s g '13 A-O $150,000.....Oct 1 '18-'53
TOTAL DEBT Apr 24 '14.....$ 150,000
Assessed valuation '14..... 6,979,564
INT. at Co. Treas. office in Eureka.

FRESNO.

County seat of Fresno County. Incorporated Oct. 27, 1885. Commission government defeated July 26, 1912.

City Hall.
4½s '06 J-J 61,000c.....1914-1943
Sewer.
5s g J-J $21,000c.....July 1 '15-'35
4½s '06 J-J 143,500c.....1914-1945
Playground Site Bonds.
4½s J-D $54,000c.....1940
Convention Hall Bonds.
5s '12 F-A $42,000.....Aug 15 '15-'42
TOTAL DEBT April '14.....$ 311,500
Assessed valuation '13 (3-5 acct.).. 20,842,966
City tax rate (per $1,000) '13.... 11.40
Population in 1910..... 24,892
INTEREST payable at City Treas. office.

FRESNO CITY SCHOOL DISTRICT.

5s .... $40,000c.....June 6 '15-'22
5s g '09 June 150,000c.....June 12 '15-'34
5s g '14 A-O 200,000c.....1920-1936
BONDED DEBT Sept. 22 '14....$ 390,000
Assessed valuation '14 (½ acct.).. 24,114,513
School tax rate (per $1,000) '14... 9.00
Population in 1912 (est.)..... 40,000
INTEREST at County Treasurer's office.

FULLERTON.

This city is in Orange County.
Water Works Bonds.
5s '12 A-O.....$80,000 .....
6s J-D..... 12,000 Part yearly
Paving Bonds.
6s .....$16,000 Part yearly
Road Bonds.
5s, '12 A-O.....$132,000
TOTAL DEBT Oct 10 '14..... 240,000
Assessed valuation '13.....2,615,545
Population in 1910.....1,725

FULLERTON UN. HIGH S. D.

Building Bonds.
5s '06 $20,000c.....1926
($2,000 due annually.)
5s J-J 50,000c.....1914-1938
5s J-D 130,000c.....1916-1941
TOTAL DEBT Sept. '14..... $200,000
Assessed valuation '13 (½ acct.)....9,250,000
School tax (per $1,000) 1913.....$0.63
INTEREST at County Treasurer's office.

GLENDALE.

A city in Los Angeles County. Incorporated Feb., 1906. Of the water bonds given below $114,000 had been sold up to date of statement.

Municipal Water Bonds...$248,000.....
Electric-Light Bonds.
5s '09 J-J $54,000c 1949
5s '12 M-S 40,000c.....March 1 '30-'34
Fire Department Bonds.
6s '07 M-S $ 4,250c 1947
5s '13 J-J 19,500.....Jan 1 '15-'52
City Hall and Library Bonds.
5s '11 J-J $16,500c 1935
Street Bonds.
5s '13 J-J $4,500.....Jan 1 '15-'23
BONDED DEBT act. '14..... $385,125
Assessed valuation '14 (2-5 act.).. 4,354,000
City tax rate (per $1,000) '13..... 12.30
Population in 1910..... 2,746
INTEREST payable at City Treas. office.

GLENDALE SCHOOL DISTRICT.

BONDED DEBT July 1 '13.....$88,000

GLENDALE UNION HIGH S. D.

TOTAL DEBT July 1 '13.....$56,000

GLENN COUNTY.

Willow is the county seat.
Road and Bridge Bonds.
5s g '11 M-N $450,000c.....Nov 1 '21-'50
TOTAL DEBT Oct '14.....$ 450,000
Assessed valuation '14..... 17,576,399
State & Co. tax rate { Outside.... 15.00
(per $1,000) '14 { Inside 19,00
Population in 1910..... 7,172
INTEREST payable at County Treas. office.

HANFORD SCHOOL DISTRICT.

6s g '12.....$32,000.....Oct 9 '15-'30
TOTAL DEBT May '13.....$43,000

HAYWARDS UNION HIGH S. D.

A district in Alameda County.
Building Bonds.
5s '12 J-J $80,000.....1922-1932
BONDED DEBT Sept '14.....$ 80,000
Assessed valuation '13 (1-3 act.).. 8,000,000
School tax rate (per $1,000) '13... 2.50
Population in 1913 (est.)..... 7,000
INT. at County Treas. office in Oakland.

HESTER SCHOOL DISTRICT.

A district in Santa Clara County.
Building Bonds (Tax-Exempt).
5s ... $8,000.....April 1 1917
5s '12 F-A 74,000c 1915-1952
BONDED DEBT April '14.....$ 82,000
Assessed valuation '13..... 2,221,065
School tax rate (per $1,000) '13.... 3.80
INTEREST payable at County Treasurer's office in San Jose.

HILLSBOROUGH.

This city is in San Mateo County. Bonds are tax-free in California. Incorporated May 5, 1910.
Street and Fire Department Bonds.
5s g '12 A-O $117,000c.....1915-1922
TOTAL DEBT Sept 21 '14.....$ 117,000
Assessed valuation '14..... 2,688,380
(Assessment 1-5 to ¼ actual value.)
Total tax (per $1,000) '14 (est.).. 30.70
Population in 1914 (est.)..... 900
INTEREST payable at City Treasurer's office, Mercantile Tr. Co., San Francisco.

IMPERIAL.

This city is in Imperial County. Incorporated August, 1904. Pop'n 1910, 1,257.
Water Bonds.
6s '09 J-J $50,000.....
(Payable annually beginning in 1919.)
Sewer and City-Hall Bonds.
6s '10 J-J $44,000.....$1,500 yearly
Sewer Bonds.
6s '11 M-S $25,000.....$1,000 yearly
BONDED DEBT Sept 1 '14.....$ 119,000
Assessed valuation '14 (65% act.). 1,406,711
Total tax rate (per $1,000) '13..... 18.00

KERN COUNTY.

County seat is Bakersfield.
Refunding Bonds.
4½s '97 J-J $90,000c.....1915-1917
Court-House Bonds.
4½s '09 M-S $400,000c.....1919-1928
Highway Bonds.
5s '13 M-S $500,000c.....Sept 1 '19-'38
BONDED DEBT April '14.....$ 520,000
Assessed valuation '13 (¼ act.)... 80,529,757
State & Co. tax rate { Inside 9.00
(per $1,000) { Outside.... 12.50
Population in 1910..... 37,715
INTEREST on refunding bonds payable at State Treasurer's office and on court-house bonds at County Treasurer's office.

LODI.

This city is in San Joaquin County. Inc. in November, 1906. Population 1910, 2,697.
Sewer Bonds.
5s '08 J-J $41,666c.....July 1 '14-'38
Light and Water Bonds.
5s '08 J-J $63,334c.....July 1 '14-'38
BONDED DEBT June 30 '14.....$ 105,000
Assessed valuation '14 (¼ act.).... 2,019,165
Total tax (per $1,000) '13..... 33.70
INTEREST at First National Bank, Lodi.

LODI UNION HIGH SCH. DIST.

6s g '12 F-A $141,000.....1915-1937
TOTAL BOND DT. April '14.....$ 141,000
Assessed valuation '13..... 6,191,635
INTEREST payable at County Treasurer's office or in New York City.

LONG BEACH.

This city is in Los Angeles County. Incorporated city of first class January 6, 1908.
City-Hall Bonds.
5s '99.....$ 5,625.....1939
Park Bonds.
5s '99.....$ 2,968.75.....1939
Bath-House Bonds.
5s '99.....$ 2,500.....1939
Wharf Bonds.
5s '01.....$ 4,460.....1941
Pier Bonds.
5s '03.....$75,000.....1943
5s '06..... 8,000.....1922
Sewer Bonds.
5s '03.....$25,375.....1943
5s g '14 J. J. 340,000c.....Jan 1 '15-'54
Public-Hall Bonds.
5s '05.....$22,000.....1935
Fire-Apparatus Bonds.
5s '05.....$22,000.....1935
Water Bonds.
4½s '09.....$220,500.....1949
...s '14..... 200,000.....
Water-Plant-Purchase Bonds.
4½s '11.....$850,000.....July 1 '17-'50
BONDED DEBT April '14.....$ 1,238,429
Assessment debt (add'l)..... 445,000
Assessed valuation '13-'14 (½ act.) 29,170,797
Oper. exp. banks (add'l)..... 2,458,515
City tax rate (per $1,000) '13..... 14.00
Population in 1910..... 17,805
INTEREST on bonds of 1914 at City Treas. office; others at Nat. Bank of Long Beach.

LONG BEACH CITY SCH. DIST.

5s '08.....$43,000.....1918
Site-Purchasing and Building Bonds.
4½s g '12.....$100,000.....
5s ..... 30,000.....
BONDED DEBT July 1 '13.....$ 125,000
Assessed valuation '13..... 21,274,695
INTEREST at County Treasurer's office.

LONG BEACH HIGH SCH. DIST.

5s g '10 A-O $216,000.....April 25 '15-'50
BONDED DEBT July 1 '13.....$222,000
INTEREST payable at County Treas. office.

LOS ANGELES.

County seat of Los Angeles County. Commission government rejected Dec. 3, 1912. All bonds are exempt from taxation in California. City founded in 1781; incorporated in 1850. In August, 1909, voted to consolidate with the city of Wilmington and with the city of San Pedro. Early in 1910 city of Hollywood was consolidated. In the same year and in the year 1912 additional territory was annexed, making present area of city 107.62 square miles. Superior Court on Aug. 31, 1914, upheld validity of $6,500,000 power bonds voted May 8, 1914.
Bridge Bonds.
4s '98 J-J $13,800c.....July 1 '15-'39
3¾s '03 J-D 72,500c.....June 1 '15-'43
Detention Hospital Bonds.
3¾s '04 J-D $37,500c.....June 1 '15-'44
Fire Department Bonds.
4s '98 J-J $90,000c.....June 1 '15-'39
Impounding Reservoir Bonds.
3¾s '04 J-D $112,500c.....June 1 '15-'44
Main and Lateral Sewer Bonds.
4s g '06 J-J $234,000c.....July 2 '15-'46
Park Bonds.
4s '98 F-A $6,000c.....Aug '15-'39
Outfall Sewer Bonds.
3¾s '03 J-D $725,000.....June '15-'43
School Improvement.
4½s '95 J-J $160,650c.....July 1 '15-'35
Refunding Bonds.
4s g '97 J-D $155,250c.....July 1 '15-'37
Polytechnic High School.
3¾s '03 J-D $145,000c.....June 1 '15-'43
Police Station Bonds.
4½s '95 J-J $21,000c.....July 1 '15-'35
Tunnel Bonds.
4s '98 F-A $96,000c.....Aug 1 '15-'38
Storm Drain Bonds.
3¾s '03 J-D $290,000c.....June '15-'43
Public School.
3¾s '03 J-D $348,000c.....June 1 '15-'43
Water Works Bonds.
4½s '95 J-J $ 15,750c.....July 1 '15-'35
4s g '05 M-N 1,200,000c.....Nov 1 '14-'45
3¾s '01 A-O 1,400,000c.....Oct 1 '14-'41
3¾s '04 J-D 213,000c.....June 1 '15-'31
Franklin Canyon Line Water Bonds.
4½s '13 M-N $1,450,000c.....May 1 '15-'43
Owens River Bonds.
4s '07 J-D $ 1,033,600c.....Dec 31 '14-'47
4½s '07 J-D 21,964,000c.....Dec 31 '14-'47
Harbor-Improvement Bonds.
4½s '11 J-D $2,225,000.....June 1 '15-'51
4½s '13 M-N 1,665,000.....May 1 '53
Electric-Light-Plant Bonds.
4½s '11 J-D $3,500,000.....June 1 '17-'51
Hollywood (annexed)—
5s '05.....$ 6,000c.....July 1 '15-'20
5s '06..... 1,000c.....Sept 1 '15-'16
5s '07..... 9,000c.....Dec 1 '14-'22
4½s '07..... 56,000c.....July 1 '15-'22
San Pedro (annexed)—
5s '04.....$16,500c.....Nov 1 '14-'24
5s '06..... 26,000c.....Nov 1 '14-'26
Wilmington (annexed)—
5s '08 M-N $85,000c.....May 1 '15-'48
BONDED DEBT Sept 22 '14...$ 37,923,050
Sinking { Owens Riv bonds..... 3,454,836
funds { Electric-plant bonds.... 259,758
Water bonds '13..... 3,295
Assessed valuation, real..... 355,785,785
Assessed valuation, personal..... 60,078,125
Assessed valuation oper. prop..... 92,382,700
Total assessed valuation '14-'15 (½ actual) 508,246,610
City tax (per $1,000) '14-'15..... 16.00
Population in 1910 (Census)..... 319,198
Population in 1914 (est.)..... 575,000
INTEREST on the Owens River bonds, outfall sewer bonds of 1892, school bonds, police station bonds and water bonds of 1895 is payable at the office of Kountze Bros., New York; on power and harbor bonds at Speyer & Co., New York; on all others at office of City Treasurer.
DEBT LIMITATION.—The revised city charter limits its debt to 3% of the assessed value of all taxable real and personal property within the city for all purposes, except water, gas, electric light, and power wharves, docks, piers, warehouses, etc., on water front, harbor improvements, and for any revenue-producing public utility. For any or all of these purposes a further indebtedness may be incurred not exceeding 12% of such assessed value.

LOS ANGELES CITY SCH. DIST.

4s '06.....$ 416,000.....Jan 1 '15-'46
4s '09..... 175,000.....April 1 '15-'19
4½s g '11 M-S.. 1,102,000.....Sept 1 '14-'51
American S. D. Bonds (Assumed).
5s '09.....$2,000.....May 17 '15-'19
4½s '09..... 1,200.....July 26 '20-'22
Annandale S. D. Bonds (Assumed).
5s '09.....$11,000.....Mar 22 '15-'25
5s '07..... 16,000.....Aug 5 '15-'30
Belvedere S. D. (Assumed).
5s '06.....$ 3,600.....Mar 26 '15-'20
4½s '10..... 31,000.....Jan 3 '15-'45
5s '08..... 24,000.....May 4 '15-'38
4½s '12..... 11,000.....April 1 '15-'25
Cahuenga Sch. Bonds (Assumed).
5s '04.....$22,000.....June 7 '15-'36
4½s '09..... 25,000.....June 28 '20-'44
Coldwater Sch. Bonds (Assumed).
5s '06.....$1,000.....June 25 '15-'16
Colegrove S. D. (Assumed).
4½s '09.....$13,000.....Sept 7 '15-'27
Gardena School Bonds (Assumed).
5s '04.....$1,000.....Sept 26 '15-'16
Hollywood Sch. Bonds (Assumed).
5s '04.....$38,000.....May 23 '15-'43
5s '05..... 5,000.....Aug 22 '15
4½s '09..... 29,000.....Dec 6 '15-'43
Lankershim S. D. Bonds (Assumed).
5s '05.....$1,000.....July 10 '15
Las Feliz S. D. Bonds (Assumed).
5s '03.....$4,500.....June 29 '15-'23
5s '07..... 3,000.....Mar 25 '15-'17
Miramonte S. D. Bonds (Assumed).
5s '08.....$10,000.....May 18 '15-'24
4½s '09..... 5,000.....July 26 '25-'29
5s '11..... 13,000.....Sept 1 '33-'45
Mt. Washington S. D. (Assumed).
5s '12.....$9,000.....Jan 1 '15-'32
San Pedro Sch. Bonds (Assumed).
6s '03.....$2,700.....Nov 9 '15-'23
5s '05..... 6,000.....Oct 10 '15-'20
Sunnyside Sch. Bonds (Assumed).
5s '06.....$6,000.....Sept 30 '15-'20
5s '06..... 2,000.....Nov 5 '21-'22
Terminal Sch. Bonds (Assumed).
5s '04.....$1,500.....June 21 '15-'18
The Pass Sch. Dist. (Assumed).
5s '04.....$5,000.....June 13 '15-'24
Washington Park Dist. (Assumed).
5s '11.....$5,000.....Aug 1 '27
5s '09..... 7,500.....April 19 '15-'29
BONDED DEBT July 1 '13.....$ 2,049,800
Assessed valuation 1913..... 413,420,613
Real value (est.)..... 825,000,000
School tax rate { Elementary 4.90
(per $1,000)) { High school.... 3.00
1913 ..... { Elem'ty & high. .50

LOS ANGELES CITY HIGH S. D.

Polytechnic High School Bonds.
4s '06.....$156,000.....Jan 1 '15-'36
4s '09..... 420,000.....April 1 '15-'49
4½s '11..... 518,000.....Sept 1 '15-'51
Hollywood H. S. Bonds (Assumed).
5s '04.....$ 32,500.....May 23 '15-'24
4½s '09..... 12,000.....June 7 '15-'20
5s '10..... 100,000.....Jan 27 '15-'34
Jewell School Bonds (Assumed).
4½s '06.....$12,000.....July 2 '15-'26
San Pedro City S. D. (Assumed).
5s '04.....$20,000.....Dec 27 '15-'24
5s '05..... 6,000.....Oct 3 '15-'20
BONDED DEBT July 1 '13.....$ 1,294,500
Assessed valuation 1913..... 413,420,613
Real value (est.)..... 825,000,000
School tax (per { Elementary 4.90
$1,000) 1913 { High school.... 3.00
{ Elem'ty & high. .50

LOS ANGELES COUNTY.

County seat is Los Angeles.
Highway Bonds.
4½s g 09 F-A $3,500,000c.....Feb 1 '15-'49
BONDED DEBT Sept 22 '14....$ 3,500,000
Assessed valuation '14 (3-5 act.).. 849,991,595
State & Co. tax rate { Inside 8.50
(per $1,000) { Outside... 12.50
Population in 1910..... 504,131
INTEREST at Kountze Bros., N. Y. C.

MENDOCINO COUNTY.

County seat is Ukiah.
Refunding Bonds.
4s '01 J-J $62,500c.....July 1 '15-'39
BONDED DEBT July 1 '13.....$ 65,000
Assessed valuation '13 (¼ act.)... 18,147,700
State & Co. tax (per { Inside 12.00
$1,000) '13 { Outside.... 18.00
Population in 1910..... 23,920

MERCED COUNTY.

County seat is Merced. Bonds are exempt from taxation.
Refunding Bonds.
4s g '03 Dec $30,000c.....Dec 1 '14-'16
BONDED DEBT Sept 25 '14.....$ 30,000
Assessed valuation '14 (¾ act.)... 25,144,757
State & Co. tax rate { Inside 13.00
(per $1,000) { Outside.... 19.00
Population in 1910..... 15,148
INTEREST at County Treasurer's office.

MODESTO.

This city is in Stanislaus County. Incorporated 1884. Re-incorporated in 1911. Operating under commission form of government. Population 1910, 4,034.
Fire, Water, Sewer and Street Bonds.
5s g '09 J-D { $30,000c.....Dec 1 '14-'25
{ 18,000c.....Dec 1 '26-'28
5s '10 J-D 87,500c.....Dec 1 '15-'49
Street Bonds.
5s '11 J-J $27,750c.....Jan 2 '15-'51
Water Bonds.
5s '12 J-J $77,500.....Jan 2 '15-'45
BONDED DEBT Sept 28 '14.....$ 249,250
Assessed valuation '14 (½ act.).... 4,389,270
City tax rate (per $1,000) '13..... 16.00

MODESTO IRRIGATION DIST.

This district (P. O. Modesto) is in Stanislaus County. Bonds are tax-free.
5s J-J $1,010,511c.....Jan '23-'42
5s J-J 332,000c.....Jan '25-'44
6s g J-J 17,100c.....Jan '15-'23
5s '09 J-J 244,000c 1929-1939
BONDED DEBT Oct 7 '14.....$1,593,611
Warrants outstanding Jan 1 '14.... 11,970
Assessed valuation '14..... 6,960,870
Tax rate (per $1,000) '14..... 25.00
INTEREST payable at Treasurer's office and First National Bank at Modesto.

MONROVIA.

Monrovia is in Los Angeles County. Incorporated December, 1887. Pop'n 1910, 3,576.

Water Bonds.
6s '94 July $20,000.....July 1 '15-'34
6s '98 July 15,000.....July 1 '15-'38
6s '00 Mar 13,135.....Mar 12 '15-'40
5s '05 J-D 3,400.....1930
5s '07 Mar 25,500.....1947
5s '07 Mar 3,500.....1927
5s '09 Mar 15,000.....1942
5s '10 Jan 47,500.....
Fire Apparatus Bonds.
5s '05 Mar $400.....1915
Library Bonds.
5s '05 J-D $400.....1915
Sewer Bonds.
5s '10 Jan $114,000.....
Park Bonds.
5s '05 J-D $14,000.....1945
Building Bonds.
5s '05 J-D $6,600.....1941
BONDED DEBT June 1 '13.....$ 282,050
Assessed valuation '13-'14 (⅓ act.). 4,000,733
Tax rate (per $1,000) '13..... 15.00
INTEREST at City Treasurer's office.

MONROVIA CITY SCH. DIST.

BONDED DEBT April 20 '14.....$ 57,750
Assessed valuation '13..... 4,150,000

MONROVIA HIGH SCH. DIST.

5s g '10 Sept $121,700c.....Sept 12 '14-'50
BONDED DEBT April '14.....$ 125,000
Assessed valuation '13..... 4,150,000
INTEREST at County Treasurer's office.

MONTEREY.

This city is in Monterey County. Incorporated as a city of sixth class in 1889. Commission government went into effect July 1, 1911.

Municipal Impt. Bonds.
5s g '09 J-J $131,448c.....Jan 2 '15-'51
BONDED DEBT Sept 23 '14.....$ 131,448
Assessed valuation '14 (⅓ act.).... 2,650,496
City tax (per $1,000) '13..... 14.50
Population in 1910..... 4,923
INTEREST at City Treasurer's office.

OAKDALE IRRIGATION DIST.

This district is in Stanislaus County.
5s '10 J-J $1,600,000c.....July 1 '31-'40
5s '13 J-J 400,000c.....Jan 1 '34-'43
BONDED DEBT Sept 21 '14.....$2,000,000
Assessed valuation '14 (1-3 act.)... 3,183,660
Total tax (per $1,000) '14 (est.)... 60.00
Population in 1914 (est.)..... 4,500
INTEREST at District Treasurer's office.

OAKLAND.

Oakland is the county seat of Alameda County. Incorporated 1854. Commission government adopted Dec. 8, 1910.

Refunding Bonds.
4s g '97 M-S $17,500c.....Sept 1 '15-'19
McElroy Bonds.
4½s g '09 J-J $3,016,700c.....Jan 1 '15-'50
Municipal Improvement Bonds.
5s '13 F-A 725,000c.....Aug 1 '15-'43
5½s '13 F-A $ 986,000c.....Aug 1 '15-'43
4½s '13 F-A 1,131,000c.....Aug 1 '15-'43
Refunding Bonds.
4s g '97 M-S $80,500c.....Sept 1 '15-'37
Sewer Bonds.
4½s g '07 J-J $485,512.50c...Jan 15 '15-'47
Park Bonds.
4½s g '07 J-J $818,400c.....Jan 15 '15-'47
School and Auditorium Bonds.
4½s '11 J-D $1,009,357.50c.June 15 '15-'51
Clawson School Bonds.
5s '14 F-A $26,000c.....Aug 1 '15-'29
Auditorium Bonds.
4½s '14 F-A $104,000c.....Aug 1 '15-'39
BONDED DEBT Sept 19 '14....$ 8,319,470
Total assessed valuation '13-'14...*153,845,660
Real value (est.)..... 307,691,840
Total tax (per $1,000) '13-'14.... 30.80
Population in 1910 (Census)..... 150,174
Population in 1914 (est.)..... 215,000
*Of the total valuation, $451,400 is exempt from taxation in accordance with State laws and $15,666,510 is taxed by the State only, but on this last-named amount the State reimburses the city for taxes on interest and redemption on bonds sold prior to Nov. 10, 1910.
INTEREST on all bonds payable at City Treasurer's office. The McElroy bonds, School and Auditorium bonds and the municipal improvement, Clawson School and Auditorium bonds of 1914, can also be paid at National City Bank, New York City.

OAKLAND SCHOOL DISTRICT.

4½s '04 J-J $720,000.....1944
4.8s '06 J-J 224,000.....1946
BONDED DEBT Oct 6 '14.....$ 994,000
Assessed valuation '14 (⅓ act.).. 135,591,670
School tax (per $1,000) '14..... 8.60
Population in 1914 (est.)..... 225,000
Bonds are exempt from taxation.
INTEREST at County Treasurer's office.

ORANGE.

This city is in Orange County.

Water Works Bonds.
5s '11 J-D $48,750.....1951
4½s '05 .... 40,000.....1945
Sewer Bonds.
5s '10 .... $14,000.....1926
Paving Bonds.
5s '10 .... $4,000.....1920
Fire Dept. Bonds.
5s '11 .... $4,500.....1921
TOTAL BOND DT. April 20 '14..$ 106,650
Assessed valuation '13..... 2,179,451
Real value (est.)..... 5,000,000
Total tax (per $1,000) '13..... 13.00
Population in 1910..... 2,920

ORANGE UNION HIGH S. D.

Building Bonds.
5s '12 M-S $46,000r.....Sept 1 '15-'37
BONDED DEBT April '14.....$ 68,000
Assessed valuation '13..... 4,398,025
School tax (per $1,000) '13..... 6.70
INTEREST at County Treasurer's office.

ORANGE COUNTY.

Santa Ana is the county seat.
4s .....$40,000.....
Bridge Bonds.
5s g '12 M-S $90,000c.....1915-1932
Hospital and Almshouse Bonds.
5s g '12 M-S $54,000.....1915-1932
Highway Bonds.
5s '13.....$1,270,000.....
BONDED DEBT July 1 '13.....$ 1,457,000
Assessed valuation '13..... 41,887,235
State & Co. tax { Inside 10.50
(per $1,000) '13 { Outside..... 14.50
Population in 1910..... 34,463

OROVILLE.

This city is in Butte County. Incorporated Jan. 3, 1906. Population 1910, 3,859.

Levee Bonds (Tax Exempt).
5s J-J $68,000c.....
($2,000 payable annually on July 1.)
Sewer Bonds (Tax Exempt).
5s J-J $108,000c.....$3,000 annually
BONDED DEBT Oct '14.....$ 176,000
Assessed valuation '14 (3-5 act.).... 1,820,263
City tax (per $1,000) '14..... 18.50
Population in 1910..... 2,555
INTEREST payable at City Treas. office.

OXNARD.

This city is in Ventura County. Incorporated in 1901.

Water-Works Bonds.
5s '12 M-N $100,000c.....May 1 '22-'46
Sewer bonds.....$ 33,625
BONDED DEBT Sept 22 '14..... 133,625
Assessed valuation '14..... 2,370,687
Tax rate (per $1,000) '14..... 11.00
Population in 1910..... 2,555
INTEREST on water-works bonds payable at City Treasurer's office.

PALO ALTO.

This city is in Santa Clara Co. Incorporated July 1, 1909. Population 1910, 4,486.

Sewer Bonds.
5s A-O $24,000c.....Oct 1 '15-'38
Improvement Bonds.
5s A-O $28,000c.....Oct 1 '15-'42
5s A-O 60,000c.....May 1 '15-'47
5s g '09 J-J 12,600c.....July 1 '14-'50
5s '11 J-D 27,500c.....July 1 '14-'31
Subway Bonds.
5s '14 J-J $9,500.....1954
Street Paving Bonds.
5s '14 J-J $25,000.....1954
Water Bonds.
5s A-O $22,000c.....July 15 '15-'36
Light and Water Bonds.
5s '12 $19,000c.....1952
Power-Plant-Impt. Bonds.
5s '12 $11,200c.....1927
Oil Pipe Line Bonds.
5s '12 $2,800c.....1927
BOND DEBT Sept. 21 '14.....$244,600
Assessed valuation '14-'15.....$9,009,572
(Assessment 3-5 on real estate and 2-5 on personal property.)
City tax (per $1,000) '12-'13.....$9.50
INTEREST payable at Bank of Palo Alto.

PASADENA.

This city is in Los Angeles County. Incorp. June 14, 1886. Resident districts of San Rafael Heights and Linda Vista annexed to this city Aug. 12, 1914.

Electric-Light-Extension Bonds.
4s '06 J-J $100,000c.....July 1 '14-'46
4s '08 A-O 42,500c.....Apr 1 '15-'48
4s '09 M-S 131,250c.....Mch 1 '14-'49
Street-Machinery Bonds.
4s '02 J-J $12,250c.....Jan 2 '15-'42
City Hall and Jail Bonds.
4s '02 J-J $34,650c.....Jan 2 '15-'42
City Hall Bonds.
4½ g '11 J-D $21,275c.....June 1 '15-'51
Park Bonds.
4s g '02 J-J $50,000c&r.....Jan 2 '15-'22
4s '02 J-J 10,000c.....Jan 2 '15-'22
Water Bonds.
4s '05 M-N $19,375c.....May 1 '15-'45
4s '02 J-J 4,200c.....Jan 2 '15-'42
Water-Plant-Purchase Bonds.
4½s '12 A-O $1,250,000.....
(Due $50,000 yearly beginning Oct 1 '17)
Sewer Bonds.
4½s '08 A-O $42,500c.....Apr 1 '15-'48
4s '02 J-J 24,500c.....Jan 2 '15-'42
Sewer Farm Bonds.
..'02 $3,500.....Jan '15-'42
Fire-Department Bonds.
4s '02 J-J $14,000c.....Jan 2 '15-'42
4s '06 J-J 60,000c.....July 1 '14-'46
4½s g '11 J-D 16,650c.....June '15-'51
Bridge Bonds.
4½s g '11 J-D $92,500c.....June 1 '15-'31
Garbage-Incinerator-Plant Bonds.
4½s g '12 M-N $52,000c.....May 1 '15-'52
BOND DEBT Sept 1 '14.....$1,981,950
Cash on hand..... 303,439
Assessed valuation '14 (2-3 acct.)..57,551,665
City tax (per $1,000) '13-'14..... 11.40
Population in 1910 (census)..... 30,291
INTEREST at City Treasurer's office.

PASADENA SCHOOL DISTRICT.

Includes the City of Pasadena and North and East Pasadena, Altadena, La Manda Park and Linda Vista School Districts.

School Bonds.
4½s '02 Sept $45,000c.....Sept 15 '15-'22
4s '03 Sept 46,000c.....Sept 8 '14-'37
4½s '04 Oct 20,000c.....Oct 24 '14-'18
4s '06 M-N 125,000c.....Mch 12 '15-'39
4½s '08 140,000c.....Apr 27 1915
4½s '11 75,000.....1917-1931
5s '14 F-A 90,000.....
(Due $5,000 yrly. for 15 yrs. beg. after 4 years from issue.)
High-School Building Bonds.
4½s '11 M-N $475,000c.....May 1 '19-'42
BOND DEBT June 1914—
City School District.....$ 548,000
High School District..... 475,000
Assessed val. '14 (33 to 40% act.)..46,632,150
Tax rate (per $1,000) { Gram. sch. bds.$1.10
'14-'15 { High sch. bds. .50
Total tax (per $1,000) '14-'15..... 8.60
INTEREST at County Treasurer's office.

PLUMAS COUNTY.

Quincy is the county seat. All bonds are tax-exempt.

Refunding Bonds.
4s A-O $35,100c.....1934
Bridge and Highway Bonds.
4s g '07 A-O $100,000.....Oct 1 '17-'32
(Part every 5 years.)
BOND DEBT Sept 22 '14.....$ 135,100
Assessed val. '14 (3-5 act.)..... 9,398,811
State & Co. tax rate { Inside ..... (?)
(per $1,000) ..... { Outside $16.00
Population in 1910..... 5,259
INTEREST at County Treasurer's office.

POMONA.

This city is in Los Angeles County. Incorp. Jan, 1888. All bonds tax-exempt. Population 1910, 10,207.

Special Fire Bonds.
5s '13 M-N $15,000c.....
(Part yearly beg. Nov 1, 1914.)
Special Street Bonds.
5s '13 M-N $75,000c.....
(Part yearly beg. Nov. 1, 1914.)
Sewer Bonds.
4s '00 J-D $20,250c.....1940
Park Bonds.
4s '03 J-D $43,500c.....1943
School Bonds.
4½s '07 J-D $33,000c.....July 1 '15-'47
City-Hall Bonds.
4½s '09 J-J $46,375c.....July 1 '15-'49
BOND DEBT June 30 '14.....$ 235,450
Assessed valuation 1914 (½ act.).. 8,490,301
Tax rate (per $1,000) '14..... 16.50
INTEREST at City Treasurer's office.

POMONA CITY SCHOOL DISTRICT.

4½s '09 $77,000.....1949
Building Bonds.
5s '13 $27,000.....1914-1923
BOND DEBT Apr 1914.....$77,000

POMONA CITY HIGH SCHOOL DIST.

4½s '03 $27,000.....1923
4½s '09 57,000.....1949
BOND DEBT Apr 1914.....$84,500

REDLANDS.

This city is in San Bernardino County. Incorporated Nov. 1888. Pop. 1910, 10,449.

Water-Works System.
5s g '12 M-N $600,000c.....Nov 15, '22-'51
Municipal Improvement Bonds.
4½ g '05 J-J $77,500c.....July 15 '15-'45
Special Improvement Bonds.
5s g '07 J-J $32,500c.....Jan 15 '15-'27
Public Park Bonds.
4½s g '07 F-A { $ 9,000c.....Aug 1 '14-'22
{ 10,000c.....Aug 1 '23-'27
5s '11 M-S 74,000c.....Mch 1 '15-'51
BOND. DEBT Jan 1 '14.....$ 610,000
Sinking fund July 1, '14..... 13,460
Assessed valuation '13 (⅓ act.)..... 9,192,300
Total tax rate (per $1,000) '13.... 42.20
INTEREST at office of City Treasurer.

REDLANDS SCHOOL DISTRICT.

Grammar School Bonds.
5s '02 $10,000..... 1915-1919
5s '02 9,000.....Sept 15 '15-'23
5s '03 16,000.....May 26 '15-'19
5s '04 9,000.....Mch 8 '15-'23
5s '07 5,000.....Apr 13 '20-'21-'22
5s g '08 Aug 50,000c.....Aug 24 '23-'32
High School Bonds.
5s '03 .....$36,000.....July 17 '15-'23
5s g '10 Apr 85,000.....1915-1935
BOND. DEBT Sept '14—
Grammar School District.....$100,000
High School District..... 121,000
Assessed val. '13 (⅓ act.).....7,719,021
School tax rate (per $1,000) '13.....$12.50
INTEREST at County Treasurer's office.

REDWOOD CITY.

This city is in San Mateo County.

Street Light Bonds.
5½s '13 A-O $5,700.....Apr 7 '15-'33
Water Works Bonds.
5½s '00 .... $5,600.....1940
Water Works Extension Bonds.
5½s '09 .... $17,000.....1929
Municipal Improvement Bonds.
4½s '04 .... $82,500.....1944
5s '10 .... 40,375.....1950
Paving Bonds.
5½s '12.... $30,000.....
BONDED DEBT July 1 '12.....$ 150,154
Assessed valuation '12..... 2,081,965
Tax rate (per $1,000) '12..... 16.70
Population in 1910.....2,442

RICHMOND.

This city is in Contra Costa County. Incorporated Aug. 7, 1905. Population, 1910, 6,802.

Harbor Bonds.
5s '13 J-J $290,000.....1914-1952
Improvement Bonds.
5s '13 J-J $270,000c.....Jan 1 '15-'23
BONDED DEBT Mar 20 '14.....$ 560,000
Assessed valuation '13..... 15,235,860
(Assessment about 60% act. value.)
Total tax (per $1,000) '13..... 26.65
City tax rate (per $1,000) '13.... 10.00
INTEREST at City Treasurer's office.

RIVERSIDE.

This city is the county seat of Riverside County. Incorporated 1883.

Street Improvement Bonds.
5s '95 s.-an. $47,250c.....Aug 1 '15-'35
Electric-Light Improvement Bonds.
5s '95 F-A $21,000c.....Aug 1 '15-'35
Steam Power Plant Bonds.
4s g '00 J-D $26,000c.....June 1 '15-'40
Fairmont Park Bonds.
4½s g '11 M-S $25,500c.....Mch 1 '15-'31
Fire Department Bonds.
4½s g '11 M-S $17,000c.....Mch 1 '15-'31
Water-Works-Purchase Bonds.
5s '13 J-D $1,131,000c.....June 1 '15-'53
BONDED DEBT Sept 30 '14.....$ 1,271,000
Floating debt July '14..... 13,690
Assessed valuation '14 (30% act.).. 10,264,999
Total tax rate (per $1,000) '14.... 43.50
Population in 1910.....15,212
INTEREST at City Treas. office & in N. Y.

RIVERSIDE CITY SCHOOL DISTRICT.

All bonds are tax-exempt.
4s g '01 F-A $ 24,000c.....1915-1920
5s '08 Feb 32,000c.....1915-1922
4½s '10 F-A 250,000c.....Aug 3 1920-'39
5s '14 M-S 50,000.....$2,000 annually
BONDED DEBT Sept 21 '14....$ 356,000
Assessed valuation '13 (30% act.) 9,659,735
School tax (per $1,000) '13..... 11.20
Population in 1914 (estimated).....17,000
INTEREST payable at County Treasury.

RIVERSIDE COUNTY.

Riverside is the county seat. All bonds are tax-exempt.
Highway Bonds.
5g '14 M-N $1,125,000c.....May 1 '25-'54
Court-House Bonds.
4s g '02 M-S $145,000c.....Sept 1 '14-'42
BONDED DEBT May '14.....$ 1,270,000
Assessed valuation '13 (1-3 act.).. 31,984,516
State and county tax (Inside 13.00
(per $1,000) '13.... (Outside.... 19.00
Population in 1910.....34,696
INTEREST on highway bonds at County Treasurer's office or at Hanover National Bank, New York; on other bonds at County Treasurer's office.

SACRAMENTO.

County seat of Sacramento County and capital of State. Re-incorporated April 23, 1863. Delinquency in payment of original debt. Commission government adopted Nov. 7, 1911 and went into effect July 1, 1912.
Levee and Sewer (red. any time).
4s g '05 J-J $120,000c.....Jan '15-'38
4s g '08 J-J 170,000c.....Jan 1 '15-'48
Sewer and Drainage.
4½s '13 .... $185,600.....July 1 '15-'53
Electric Distribution.
4½s '14 .... $9,600.....Jan 1 '15-'54
Levee Bonds.
4½s '13 J-J $751,825.....Jan 1 '15-'53
4s '08 J-J 60,000c.....July 1 '15-'38
High-School Bonds.
4s '05 J-J $155,000c.....Jan 1 '15-'45
4s '08 J-J 38,000c.....July 1 '15-'33
City-Hall Bonds.
4s '07 J-J $247,500c.....July 1 '15-'47
Water-Main Bonds (red. any time).
4½s '13 .... $ 35,500.....July 1 '15-'53
4s '03 J-J 106,000c.....Jan 1 '15-'41
River Improvement Bonds.
4½s .... $67,500c.....Jan 1 '15-'41
Old bonds outstanding.....$ 7,100
BONDED DEBT Oct '14..... 1,953,625
Sinking fund 31,607
Assessed valuation '14 (72% act.)..74,163,100
City tax (per $1,000) '14..... 14.60
Population in 1910 (Census).....44,696
Population in 1914 (estimated).....75,000
INTEREST on 4½% levee bonds at City Treasurer's office or at Bank of New York, N. B. A.; other bonds in Sacramento at Capital National Bank.

SACRAMENTO CITY SCHOOL DIST.

4½s '11 J-J $2000,000.....
(Maturity 20 bonds in 6 years and 10 bonds every six months thereafter.)
BONDED DEBT Mar '14.....$ 200,000
Assessed valuation '13 (3-5 act.).. 56,869,230
Population in 1914 (estimated).....71,000
INTEREST at County Treasurer's office.

SACRAMENTO CITY HIGH S. D.

Building Bonds.
4½s '11 J-J $100,000.....
(Maturity $4,000 in 16 years and $2,000 every 6 months thereafter.)
BONDED DEBT Mar '14.....$ 100,000
Assessed valuation '13 (3-5 act.).. 56,869,230
INTEREST at County Treasurer's office.

SACRAMENTO COUNTY.

County seat is Sacramento.
Bridge Bonds.
4½s '08 J-J $225,000c.....Jan 1 '17-'48
Court-House and Jail Bonds.
4½s '08 J-J $660,000c.....Jan 1 '17-'48
Road Bonds.
4½s '08 J-J $600,000c.....Jan 1 '17-'48
BONDED DEBT Apr '14.....$ 1,485,000
Floating debt 66,825
Value of county property '13..... 1,221,234
Assessed valuation '13 (3-5 act.).. 80,057,358
State and county (Inside 12.23
tax (per $1,000) (Outside..... 16.70
Population in 1910.....67,806

SALINAS CITY.

This city is in Monterey County. Incorporated Feb. 11, 1903. Population, 1910, 3,736.
Sewer Bonds.
5s '97 J-J $23,000c.....Jan 2 '15-'37
City Hall Bonds.
5s g '06 J-D $41,250c.....Dec 31 '14-'46
School Bonds.
5s '09 J-J $18,750c.....Jan 2 '15-'39
5s '06 J-D 12,375c.....Dec 31 '14-'46
BONDED DEBT Sept 23 '14.....$ 95,375
Assessed valuation '14 (3-5 act.).. 2,502,394
Total tax rate (per $1,000) '14..... 28.70
INTEREST at City Treasurer's office.

SAN BENITO COUNTY.

Hollister is the county seat.
High-School Bonds.
5s .... $24,000.....$3,000 yearly
Road Bonds.
5s '12 J-J $280,000.....July 1 '15-'42
BONDED DEBT Sept 22 '14.....$ 304,000
Assessed valuation '14 (3-5 act.).... 9,091,200
County tax (per (Inside 27.00
$1,000) '14 (Outside..... 29.00
Population in 1910.....8,041
INTEREST at Holister.

SAN BERNARDINO.

This city is located in San Bernardino County. Incorporated 1886.
An amendment to the city charter was adopted on April 18, 1913 and subsequently approved by the Legislature, increasing the borrowing capacity to 15% of the assessed valuation. Population 1910, 12,779.
Water Bonds.
4s '03 A-O $118,175c.....Apr 1 '15-'43
4s '03 A-O 48,300c.....Apr 1 '15-'43
Improvements Bonds.—(*Tax Exempt.*)
4½ s '08 A-O $93,500c.....1915-1948
BONDED DEBT Sept '14.....$ 262,725
Assessed valuation (Non operative.. 4,686,885
'13-'14 ..... (Operative..... 1,258,731
Total tax (per $1,000) '14-'15..... 32.00
INTEREST is payable at City Treasurer's office and in New York.

SAN BERNARDINO HIGH S. D.

This district not only includes the city of San Bernardino, but also adjacent territory.
5s g '14 A-O $250,000.....
(Due $5,000 yearly from 6 to 25 years inclusive and $10,000 yearly from 26 to 40 years inclusive.)
BONDED DEBT May '14.....$ 250,000
Assessed valuation (Non operative.. 5,648,275
'13-'14 ..... (Operative..... 1,393,052
Real value (estimated).....12,000,000
INTEREST at County Treasurer's office.

SAN DIEGO

This is the county seat of San Diego Co. Incorporated Jan. 1, 1835. All bonds are tax-exempt. All bonds due part yearly. Population 39,578.
Reservoir Bonds.
4½g '07 J-D $123,933c.....June 1 '15-'45
Sewer Bonds.
4½s '03 J-J $101,500c.....July 1 '15-'43
4½s '05 A-O 58,125c.....Oct 1 '15-'45
4½s '07 J-D 42,394c.....June 1 '15-'43
4½s '07 J-D 1,148c.....June 1 '15-'17
4½s '07 J-D 9,334c.....June 1 '15-'33
4½s '07 J-D 889c.....June 1 '15-'16
4½s '07 J-D 27,112c.....June 1 '15-'42
4½s '04 .... 85,000c.....1948
4½s .... 24,050c.....1950
4½s .... 2,000c.....1918
4½s .... 5,900c.....1926
4½g '11 J-J 68,500c.....Jan 1 '15-'48
4½s '13 .... 114,000.....1952
Refunding Bonds.
4½s '98 J-J $156,000c.....Jan 1915-'38
Fire Department Bonds.
4½s '03 .... $26,000c.....July 1 '15-'40
4½s '07 .... 52,000c.....June 1 '15-'40
4½s '12 .... 75,000c.....1952
Water Bonds.
4½s '01 J-J $ 406,000c.....July 1 '15-'41
4½s '03 J-J 144,275c.....July 1 '15-'43
4½s '05 A-O 41,850c.....Oct 1 '15-'45
4½s '07 J-D 48,608c.....June 1 '15-'47
4½s '07 J-D 216,891c.....June 1 '15-'45
4½g '11 J-J 313,000c.....Jan 1 '15-'48
4½s '12 .... 275,000 1952
4½s '12 J-J 323,000c.....1952
4½s '13 J-J 2,437,500c.....Jan 1 '15-'52
5s g '14 A-O 705,000 .....Apr 1 '15-'54
4½s '14 J-J 1,500,000c.....July 1 '15-'54
Street Bonds.
4½s '12 .... $51,250c.....1952
Boulevard and Road Bonds.
4½g '07 J-J $56,000c.....June 1 '15-'42
Cemetery Road Bonds.
4½s '07 J-D $1,500c.....June 1 '15-'17
Concrete Culvert Bonds.
4½s '07 J-D $39,500c.....June 1 '15-'41
Park Bonds.
4½s g J-J $925,000c.....1950
5s g '13 M-S 828,750c.....Sept 1 '15-'53
Playground-Purchase Bonds.
4½s '13 .... $71,250.....1952
Wharf and Harbor Bonds.
4½g '11 J-J $950,000c.....Jan 7 '15-'51
Municipal Improvement Bonds.
4½s '12 J-J $9,000c.....1932
TOTAL DEBT Sept 1 '14.....$10,341,734
Assessed valuation '14 (½ act.).... 84,993,931
City tax rate (per $1,000) '14..... 15.70
INTEREST at City Treasurer's office and at National Park Bank, New York.

SAN DIEGO SCHOOL DISTRICT.

4s g '06 July $ 72,000c.....July '15-'26
5s '07 July 130,000c.....July 5 '15-'27
4½s '09 s-an 45,000c.....1921-1929
5s '13 A-O 350,000c.....1919-1953
BONDED DEBT Sept '14.....$ 597,000
Assessed valuation '13 (2-3 act.).. 50,356,208
School tax rate (per $1,000) '13.. 8.00
INTEREST at County Treasurer's office.

SAN DIEGO HIGH SCHOOL DISTRICT.

5s g '05 M-S $ 99,000c.....Sept '15-'25
5s '11 Feb 200,000 .....Feb 6 '17-'51
BONDED DEBT Sept '14.....$ 299,000
Assessed valuation '13 (2-3 act.).. 50,356,280
School tax rate (per $1,000) '12.. 8.00
INTEREST at County Treasurer's office.

SAN DIEGO COUNTY.

San Diego is the county seat.
Highway Bonds.
4½g '09 A-O $1,095,000c.....Oct 1 '15-'49
BONDED DEBT Oct '14.....$ 1,095,000
Sinking fund Sept '14..... 50,329
Assessed valuation '14 (40% act.) 75,780,118
State and county tax (Inside 11.90
(per $1,000) '14... (Outside.... 18.50
Population in 1910.....61,665
INTEREST at County Treasurer's office.

SAN FRANCISCO.

San Francisco is in San Francisco County. Financial statement given below is for both city and county.
At an election held Dec. 10, 1912, 17 amendments to the city charter were adopted.
An agreement has been reached between the city and the Spring Valley Water Co. on a plan of condemnation proceedings.
The Board of Supervisors on Jan. 5, 1914, passed an ordinance formally accepting the water supply and power rights in the Hetch-Hetchy Valley, granted in the bill passed by Congress in 1913.
The $5,000,000 5% exposition bonds given in table below are not figured in the 15% debt limit. These bonds were voted Nov. 15, 1910. See remarks under State of California for constitutional amendments giving authority to issue these and other bonds.
On Aug. 26, 1913, the voters authorized the issuance of $3,500,000 municipal-railway-system bonds. Up to March 20, 1914, $1,802,500 had been disposed of.
Golden Gate Park Bonds.
3½s '04 J-J $246,000c.....July 1 '15-'44
Library Bonds.
3½s '04 J-J $328,800c.....July 1 '15-'22
Mission Park Bonds.
3½s '04 J-J $219,000c.....July 1 '15-'44
Playground Bonds.
3½s '04 J-J $555,000c.....July 1 '15-'44
Hospital Bonds.
5s '08 J-J $1,800,000.....July 1 '15-'32
Hospital-Jail Completion Bonds.
4½ '13 A-O $629,000.....Apr 1 '16-'37
Sewer Bonds.
5s '08 J-J $3,629,000c.....July 1 '15-'54
3½s '04 .... 8,000c.....
Polytechnic High-School Bonds.
4½s '10 J-J $575,000c.....July 1 '14-'37
Fire-Protection Bonds.
5s '08 J-J $5,200,000c.....July 1 '16-'55
Garbage Disposal Bonds.
5s '08 J-J $672,000c.....July 1 '15-'30
School Bonds.
3½s '04 J-J $ 785,400c.....July 1 '14-'16
5s '08 J-J 4,800,000c.....July 1 '15-'38
Street Bonds.
3½s '04 J-J $506,250c.....July 1 '15-'19
City Jail and Hall of Justice.
3½s '04 J-J $104,400c.....July 1 '15-'20
5s '08 J-J 850,000c.....July 1 '15-'31
Water-Supply Bonds.
4½s '10 J-J $ 100,000 .....Jan 1 1915
4½s '10 J-J 1,212,000c.....1920-1964
Geary Street Ry. Bonds.
4½s '10 J-J $1,900,000c.....July 1 '15-'34
Market Street Ry. Bonds.
4½s '10 .... $69,000.....
Union Street Ry. Bonds.
5s g '13 J-D $1,802,500c.....Dec 1 '17-'51
Exposition Bonds.
5s '12 M-N $5,000,000.....
(Payable $200,000 yearly beginning May 1 '17)
City-Hall and Civic-Centre Bonds.
5s '12 J-J $7,480,000c.....July 1 '17-'60
Special bonds made payable by statute from taxes on lands benefited:
Montgomery Ave. bonds.....$1,579,000
Dupont Street bonds, 7s, amount outstanding 285,000

Both the Dupont St. and the Montgomery Ave. bonds have long been in default, but they were not obligations of the municipality.
Holders of Montgomery Ave. bonds brought suit against the State to recover the face value and interest aggregating $2,000,000. The Superior Court holds that the State is not liable. Appeal was taken, which up to March 25, 1914, was still pending.

INTEREST is payable in gold in San Francisco.

TOTAL DEBT. SINKING FUNDS, etc.

	Mar. 20 '14	Oct. 31 '13
Total bonded debt..	$39,485,100	$34,997,600
Sinking funds	592,433	36,488
Net debt	$38,892,667	$34,961,112

CITY PROPERTY.—The following is a description of the property owned by the City and County of San Francisco, as transmitted to the State Comtroller by direction of the Board of Supervisors Oct. 13, 1913. The water, gas and electric-light plant are not owned by the city:

Park reservations, public squares and improvements	$33,543,000
Fire department, lots and improvements, apparatus, etc.	3,930,130
Police department, lots, improvements and furnishings.....	342,100
Auxiliary fire-alarm system.....	5,496,000
City Hall, Hall of Justice, county jails, hospitals, amshouses, lots and improvements and furniture	5,751,300
Channel St. lots from 9th to 18th streets	610,000
School lots, improvements, libraries, furniture, etc.	12,963,520
Garbage system.....	684,756
Hetch-Hetchy lands.....	1,240,440
County-line Water Co., lands and property	30,000
Geary Street railway.....	1,616,625
Civic Centre lands.....	5,700,000
Total	$71,907,871

SAN FRANCISCO—Concluded.
ASSESSED VALUATION AND TAX RATE.—Property is assessed at about 50% of its actual value. Assessment decreased in 1906, owing to earthquake.

	1913-14.	1912-13.
Real estate	$461,282,132	$447,777,237
Personal	64,965,404	62,652,079
Total	$526,247,536	$510,429,316
Tax (per $1,000)	22.42	20.50

Tax rate for city and county purposes for 1913-'14 is $20.20 and for State purposes $0.42 per $1,000 of valuation.
The amount of taxes levied in 1913-'14 for city and county purposes was $11,577,445.79; for State purposes, $221,023.96; total amount of taxes, $11,798,469.75.
POPULATION.—In 1910 (Census), 416,912; in 1900 (Census), 342,782; in 1890, 298,997; in 1880, 233,959; in 1870, 149,473.

SAN JOAQUIN COUNTY.

Stockton is the county seat.
Highway Bonds.
5s g '09 J-J $1,750,000c.....1949
BONDED DEBT Mar '14.....$ 1,750,000
Assessed valuation '14 (3-5 act.).. 60,638,988
State and County tax { Inside 14.50
(per $1,000) '14.... { Outside.... 18.50
Population in 1910.....50,731
INTEREST at County Treasurer's office or at office of Kountze Bros., New York.

SAN JOSE.

This city is in Santa Clara County. Incorporated 1850. Bonds tax-free. An election held November 2, 1911, favored annexing East San Jose to this city. In December, 1912, Port San Jose was annexed.
Municipal Improvement Bonds.
4s g '06 A-O $172,000c.....Apr 1 '15-'46
High School Bonds.
4½s g J-D $43,125c.....June 1 '15-'37
Sewer Bonds.
4½s g J-D $23,000c.....June 1 '15-'37
4½s '12 F-A 95,000 .....Feb 1 '15-'52
City-Hall and Fire Bonds.
4½s g F-A $123,750c.....Aug 1 '15-'47
Park Bonds.
4½s '12 F-A $104,500.....Feb 1 '15-'52
Fire and Police Department Bonds.
4½s '12 F-A $57,000.....Feb 1 '15-'52
Incinerator Bonds.
4½s '12 F-A $47,500.....Feb 1 '15-'52
Bridge and Creek Bonds.
4½s '12 F-A $52,250.....Feb 1 '15-'52
Station Bonds.
4½s '12 F-A $1,900.....Feb 1 '15-'52
East San Jose Bonds (Assumed).
5s '09 .... $54,000.....
(Payable part yearly for 40 years.)
BONDED DEBT Jan 1 '14.....$ 772,525
Total assessed valuation '13-'14.... 24,177,405
(Assessment 60-70% actual value.)
City tax rate (per $1,000) '13..... 12.40
Population in 1910.....28,946
INTEREST at City Treasurer's office.

SAN JOSE SCHOOL DISTRICT.

4s g '07 Jan $189,265c.....Jan 1 '15-'47
5s '08 M-N 29,000c.....May 1 '15-'43
BONDED DEBT Apr '14.....$ 219,000
Assessed valuation '13 (3-5 act.).. 23,640,756
INTEREST at County Treasurer's office.

SAN JOSE HIGH SCHOOL DISTRICT.

4s Jan $127,000.....Jan 1 1927
5s '08 M-N 14,000c.....May 1 '15-'28
BONDED DEBT Apr '14.....$ 33,000
Assessed valuation '13 (3-5 act.).. 23,640,756
School tax rate (per $1,000) '12.. .65
INTEREST at County Treasurer's office.

SAN LUIS OBISPO.

This city is in San Luis Obispo County.
Water Bonds.
5s '99 .... $56,000.....1939
Sewer Bonds.
5s '99 .... $26,100.....1939
Improvement Bonds.
5s '09 .... $171,000.....1949
BONDED DEBT May 15 '13.....$ 142,000
Assessed valuation..... 3,382,243
Tax rate (per $1,000) '11..... 23.30
Population in 1910.....5,157
INTEREST at City Treasurer's office.

SAN LUIS OBISPO COUNTY.

San Luis Obispo is the county seat. Bonds tax-free. Population, 1910, 19,383.
Wharf (Red. after 10 yrs. from issue).
5s g '06 July $32,000c.....July 1 '15-'30
5s g '06 July 42,000c.....July 1 '15-'35
BONDED DEBT Sept 24 '14....$ 74,000
Assessed valuation '14-'15..... 18,338,866
State and county tax { Inside 16.20
(per $1,000) '14.. { Outside.... 22.00
INTEREST at County Treasurer's office.

SAN MATEO COUNTY.

Redwood City is the county seat.
Highway Bonds.
5s '13 J-J $1,250,000.....July 1 '17-'42
Court-House Bonds.
4s g '06 M-S $135,397c.....Sept 1 '14-'46
BONDED DEBT July 1 '13.....$ 491,500
Assessed valuation '13..... 29,479,940
State and county tax { Inside 10.50
tax (per $1,000).... { Outside.... 16.50
Population in 1910.....26,585
INTEREST at County Treasurer's office.

SANTA ANA.

This city is in Orange County. Incorporated June 1, 1886. Bonds tax-free. Population 1910, 9,800.
Water Bonds.
5s '05 F-A $77,500r.....Feb 1 '15-'45
4½s '11 M-S 18,000.....Mar 1 1931
5s '14 s-a 63,000.....1915-1954
Sewer Bonds.
4½s '98 .... $40,625c.....Apr 1938
City Hall.
4½s '04 .... $11,000r.....Nov 1924
School Bonds.
4½s '04 .... $3,000.....Nov 1915
Fire Bonds.
5s '14 s-a $12,000.....1915-1938
BONDED DEBT Apr 28 '13.....$ 152,625
Assessed value (35% act.) '12.... 6,417,800
City tax (per $1,000) '12..... 12.00
INTEREST payable at Treasurer's office.

SANTA BARBARA.

Santa Barbara is in Santa Barbara County. Incorporated March 9, 1874.
Main Sewer Bonds.
4½s g '03 F-A $10,150c.....Aug 1 '15-'43
Bridge Bonds.
4½g '03 F-A $14,500c.....Aug 1 '15-'43
High-School Bonds.
5s '01 Jan $40,500c.....Jan 10 '15-'41
Oak Park Bonds.
4½s '04 F-A $11,250c.....Aug 15 '15-'44
Water Bonds.
4½s '01 J-J $ 42,000c.....July 1 '15-'41
4½s '03 F-A 145,000c.....Aug 1 '15-'43
Water Works Extension Tunnel.
4½s '08 M-S $170,000c.....Sep 1 '15-'48
4½s '10 A-O 180,000c.....Oct 1 '15-50
Mission Tunnel.
5s M-N $116,000.....Nov 1 '15-'33
Boulevard Bonds.
4½ '07 M-S $42,500c.....Sept 3 '15-'47
4½ '03 F-A 36,250c.....Aug 1 '15-43
Street Bonds.
4½s '09 J-J $37,625c.....July 1 '15-'49
BONDED DEBT July 1 '14.....$ 868,325
Sinking fund 27,749
Assessed valuation '13 (3-5 act.).. 9,893,030
City tax rate (per { Inside 14.00
$1,000) '12-'13... { Outside..... 12.60
Population in 1910 11,659
INTEREST on water works extension tunnel and street bonds at Kountze Bros., N. Y. and City Treasurer's office; other bonds at City Treasurer's office.

SANTA BARBARA COUNTY.

Santa Barbara is the county seat.
Road Bonds.
6s '11 J-J $34,000c.....July '15-'31
6s '11 A-O 75,000c.....$5,000 yearly
6s '12 ann 45,000c.....July 22 '15-'32
6s '13 ann 34,000c.....July 1915-30
County has no general bonded debt.
Road dist. debt Oct 6 '14.....$ 188,000
Assessed valuation '14 (70% act.) 29,154,461
State and county tax { Inside 16.00
(per $1,000) '14.. { Outside.... 20.00
Population in 1910.....27,738
INTEREST at County Treasurer's office.

SANTA CLARA.

This town is in Santa Clara County. Incorporated March 6, 1872. Pop'n 1910, 4,348.
Gas Bonds.
5s '00 J-J $19,500c.....Jan 1 '15-'40
Water, Light and Power Bonds.
4½s '07 M-N $17,325c.....May 1 '15-'47
Sewer Bonds.
4½s '07 M-N $24,750c.....May 1 '15-'47
Water Bonds.
5s '95 M-N $31,500c.....May 1 '15-'35
School Bonds.
5s g '05 J-J $38,750.....Jan 2 '15-'45
4½s '07 M-N 675.....May 1 '15-'47
5s '12 .... 58,500.....
Fire Apparatus Bonds.
5s '12 .... $5,362.50.....
BONDED DEBT May 1 '14.....$ 205,691
Local impt. bonds (included)..... 9,328
Assessed valuation '14 (3-5 act.).... 2,417,553
Total tax rate (per $1,000) '14..... 14.75
INTEREST payable at Treasurer's office.

SANTA CLARA COUNTY.

San Jose is the county seat.
4s '07 Jan $300,000c.....1947
BONDED DEBT Apr '14.....$ 300,000
Assessed valuation '13..... 80,072,624
State and county tax { Inside 11.50
(Per $1,000) '13.. { Outside.... 15.60
Population in 1910.....83,538
INTEREST at County Treasurer's office.

SANTA CRUZ.

This city is in Santa Cruz County. Commission government adopted Jan. 31, 1911. City's liability on Water Co. bonds assumed by it sustained by U. S. Circuit Court of Appeals on Jan. 13, 1913.
Wharf and Bridge Bonds.
5s '14 J-J $182,000c.....Jan 15 1954
Refunding Bonds.
4s '94 Apr $189,000c.....1934
Water-Plant Purchase Bonds.
5s '13 F-A $220,000.....Feb 1 1930
BONDED DEBT Apr 1 '14.....$ 591,000
Assessed val. '13 (abt. 1-3 act.).... 7,286,555
Total tax rate (per $1,000) '13..... 14.80
Population in 1910.....11,146
INTEREST at City Treasury.

SANTA CRUZ HIGH SCHOOL DIST.

Building Bonds.
5s g '14 M-S $160,000c.....Mar 25 '19-'50
BONDED DEBT Sept '14.....$ 160,000
Assessed valuation (real and pers.) 7,588,800
Real valuation between $15,000,000 20,000,000
Population in 1914 (estimated).....12,000
INTEREST at County Treasurer's office in Santa Cruz.

SANTA CRUZ SCHOOL DISTRICT.

Building Bonds.
5s g '14 M-S $80,000c.....Mar 25 '15-'54
BONDED DEBT Sept '14.....$ 100,000
Assessed valuation (real and pers.) 7,588,800
Real valuation between $15,000,000 & 20,000,000
Population in 1914 (estimated).....12,000
INTEREST at County Treasurer's office in Santa Cruz.

SANTA MONICA.

This city is in Los Angeles County. Incorporated Nov. 20, 1886; chartered 1907. Purchase of local water plant is proposed.
Sewer and Incinerator Bonds.
5s '07 M-N $132,000.....Nov 1 '15-'47
Fire Apparatus (*part yearly*).
5s '06 .... $15,000.....1941
Crematory Bonds (*part yearly*).
5s '06 .... $7,500.....1926
Storm-Drain Bonds (*part yearly*).
5s '06 .... $11,500.....1934
Sewer Bonds (*part yearly*).
6s '97 .... $26,000.....1937
5s '06 .... 32,000.....1943
City-Hall Bonds (*part yearly*).
5s '02 .... $26,000.....1937
Bridge Bonds (*part yearly*).
5s '02 .... $16,000.....1927
5s '06 .... 4,000.....1919
5s '06 .... 12,500.....1936
BONDED DEBT Sept 19 '14.....$ 273,000
Assessed valuation '14 (½ act.)... 15,747,455
Tax rate (per $1,000) '14..... 14.00
Population in 1910.....7,847

SANTA MONICA CITY SCHOOL DIST.

4½s '05 .... $ 8,000.....Nov 7 1915
4½s '06 .... 8,000.....June 21 1915
5s '08 M-N 30,000.....1918-1932
5s g '11 A-O 25,000.....Apr 1 '17-'29
5s '12 .... 80,000.....Oct 1 '17-'52
BONDED DEBT Sept 21 '14.....$171,000
INTEREST at County Treasurer's office.

SANTA MONICA HIGH SCHOOL DIST.

Polytechnic High-School Bonds.
5s g '11 A-O $200,000.....Apr 1 '17-'51
High-School Bonds.
5s '12 A-O $70,000.....Oct 1 '17-'52
TOTAL DEBT Sept 21 '14.....$ 270,000
Assessed valuation 11,342,155
INTEREST payable at County Treasury.

SANTA ROSA.

This city is in Sonoma County. Incorporated in 1872.
Water Bonds.
4s '95 Jan $82,500c.....1915-1925
4s '05 Jan 62,500c.....1915-1925
Sewer Bonds.
4s '05 Jan $56,000c.....1915-1925
Fire-Engine Bonds.
4s '05 Jan $1,000c.....1914-1925
BONDED DEBT March '14.....$ 242,100
Assessed valuation '13-'14 (3-5 act.) 6,429,885
Total tax rate (per $1,000) '13..... 14.00
Population in 1910..... 7,817
INT. at Cy. Tr. of. and Un. Tr. & Sgs Bk.

SANTA ROSA—COURT HOUSE SCHOOL DISTRICT.

High School Bonds.
5s '11 A-O $80,000.....1951
Grammar School (l'art yearly).
4½s .... $24,000.....July 1 1925
BONDED DEBT April 28 '14—
High School District.....$80,000
Grammar School District..... 24,000

SAUSALITO.

This town is in Marin County.
Water Bonds.
5s '09 J-J $87,500c.....Jan 15 '15-'49
BONDED DEBT Jan '14.....$ 87,500
Assessed valuation '13-'14 (3-5 act.) 2,061,150
Total tax rate (per $1,000) '13..... 13.70
Population in 1910..... 2,383

SIERRA MADRE.

This city is in Los Angeles County.
Water-Works Bonds (part yearly).
5s '10 s-an $ 40,000c.....
5s '11 s-an 111,000c.....
5s '12 s-an 75,000c.....1929-1953
5s '13 s-an 20,000c.....
5s '13 J-D 111,000c.....
5s '13 a-an 20,000c.....
5s .... 36,000.....
BONDED DEBT April '14.....$ 171,000
Assessed valuation '13 (½ act.)..... 1,575,000
City tax rate (per $1,000) '13..... 15.00
Population in 1910..... 1,303
INTEREST at City Treasurer's office.

SOLANO COUNTY.

Fairfield is the county seat.
Court-House Bonds.
5s g '09 .... $200,000c.....Dec 1 '15-'34
BONDED DEBT March '14.....$ 210,000
Assessed val. '13 (65% act.)..... 25,406,952
State & Co. tax rate { Inside 13.00
(per $1,000) '13 { Outside..... 17.00
Population in 1910..... 27,559
INTEREST payable at County Treas. office.

SONOMA COUNTY.

Santa Rosa is the county seat.
Court-House Bonds (Tax-Exempt).
4½ g '07 June $268,000c.....June 30 '14-'42
BONDED DEBT March '14.....$ 268,000
Assessed valuation '13..... 40,781,686
State & Co. tax { Inside 12.00
(per M) in '13 { Outside..... 16.00
Population in 1910..... 48,394
INTEREST payable at County Treas. office.

SOUTH PASADENA.

This city is in Los Angeles County.
Bridge Bonds.
4½s '11 ... $28,000.....
Fire Prot., Paving and Cy.-Yard Bonds.
5s g '14 J-J $50,000c.....Jan 2 '15-'54
Sewer Bonds.
5s g '14 J-J $120,000c.....Jan 2 '15-'54
BONDED DEBT Sept 21 '14.....$ 198,000
Assessed val. '14 { Non-operative... 5,792,415
{ Operative..... 644,720
Tax rate (per $1,000) '14..... 15.00
Population in 1910..... 4,649
INTEREST at City Treasurer's office.

SOUTH SAN JOAQUIN IRR. DIST.
A district in San Joaquin County. The bonds of 1914 are part of an issue of $790,000.
Irrigation Bonds.
5s '10 J-J $1,875,000c.....July 1 '31-'40
5s '13 J-J 1,170,000c.....Apr 18 1943
(Bonds are subject to call at any interest time by mutual agreement.)
Reservoir-Construction Bonds.
5s '14 J-J $790,000.....July 1 '34-'43
BONDED DEBT April '14.....$3,835,000
Assessed valuation, real, '13..... 3,000,000
(Assessment about 30% actual value.)
Total tax rate (per $1,000) '12.....$40.00
INT. at Dist. Treas. office in N. Y.

STOCKTON.
Stockton is in San Joaquin County. Incorporated Aug. 5, 1850. Population 1910, 23,253.
Sewer Bonds.
4s .....$35,100.....Sept 1 '40
4s ..... 31,000.....Nov 1 '46
Street-Improvement Bonds.
5s g '06 F-A $154,275c.....Feb 1 '47
BONDED DEBT April 1 '14.....$ 222,375
Assessed valuation '13 (2-3 act.).. 26,269,804
City tax rate (per $1,000) '14..... 15.00
INTEREST at First National Bank.

STOCKTON SCHOOL DISTRICT.
(Part due each year.)
6s '11 M-N $72,000c.....1936
5s July $52,500c.....July 1 '15-'21
(Part due yearly on July 1.)
High-School Bonds.
5s '13 J-J $98,000c.....
Grammar-School Bonds.
5s '13 J-J $498,000c.....
(Part due yearly on July 1.)
TOTAL BOND. DT. March '14...$ 720,500
Assessed valuation '14 (3-5 act.).. 22,177,155
School tax (per $1,000) '14..... 9.00
INTEREST at Stockton Savings Bank.

SUTTER CO. LEVEE DIST. No. 1.
This district (P. O. Yuba City) is in Sutter County.
6s '08 s-a $230,000c.....1933
6s '10 s-a 100,000c.....1935
BONDED DEBT March '14.....$ 330,000
Assessed valuation '13 (40% act.).. 3,105,220
Tax rate (per $1,000) '13..... 45.00

TULARE.
This city is in Tulare County.
The voters in February, 1913, defeated a proposition to purchase local water company for $44,000.
Water Bonds.
5s g '12 J-D $100,000c.....Dec 1 '17-'49
Municipal-Improvement Bonds.
5s g '12 J-D $7,500c.....Dec 1 '14-'28
5s g '12 J-D 1,900c.....Dec 1 '14-'32
BONDED DEBT May '13.....$ 186,000
Assessed valuation '12..... 1,407,620
Tax rate (per $1,000) '12..... 16.00
Population in 1910..... 2,758
INTEREST at City Treasurer's office.

TURLOCK.
This city is in Stanislaus County.
Sewer Bonds.
5s '09 .....$25,650.....1949
5s '10 ..... 9,750.....1920
Water Bonds.
5s '09 .....$24,700.....1949
5s '10 ..... 14,625.....1920
Water and Sewer Bonds.
..'12 .....$25,000.....
BONDED DEBT April 1 '12.....$ 74,725
Assessed valuation '12..... 1,113,045
Total tax rate (per $1,000) '12..... 13.70
Population in 1910..... 1,573

TURLOCK IRRIGATION DIST.
This district (P. O. Turlock) is in Stanislaus County.
5s '02 J-J $1,156,000c.....July 1 '22-'41
5s '05 J-J 200,000c.....Jan 1 '26-'35
5s '10 J-J 100,000c.....July 1 '31-'40
5s '11 J-J 1,040,400c.....1932-1941
BONDED DEBT May '14.....$ 2,396,400
Assessed valuation '13 (45% act.). 10,099,470
District tax rate (per $1,000) '13.. 35.50
Population in 1913 (est.)..... 16,000
INTEREST at Commercial Bank, Turlock.

VALLEJO.
This city is in Solano County. Incorporated March 30, 1868. Commission government adopted Feb. 21, 1911.
Refunding Bonds.
5s '95 F-A $16,800c.....Aug 1 '15-'35
Water Bonds.
5s '02 M-N $36,000c.....May 1 '15-'22
5s '05 M-N 49,500c.....May 1 '15-'25
5s '08 M-S 55,000c.....Sept 1 '15-'25
5s g '11... 76,053c.....Jan 1 '15-'31
Harbor-Improvement Bonds.
5½s '14 M-N $142,000.....May 1 '15-'35
BONDED DEBT April 23 '14....$ 248,600
Assessed valuation '13 (3-5 act.).... 5,525,108
City tax rate (per $1,000) '13..... 17.50
Population, 1910 11,324
INTEREST at City Treasurer's office.

VALLEJO HIGH SCH. DIST.
5s '10 s-an $54,000c.....1914-1935
BONDED DEBT March '14.....$ 54,000
Assessed valuation '13 (65% act.).. 4,425,672
School tax rate (per $1,000) '13.... 5.70
Population in 1913 (estimated).....13,000
INTEREST at County Treasurer's office.

VAN NUYS GRAM. SCH. DIST.
A district in Los Angeles County.
Building Bonds.
5s '12 Feb $50,000.....
TOTAL BOND. DT. April 1 '14...$ 50,000
Assessed valuation '13..... 4,486,340

VAN NUYS HIGH SCH. DIST.
5½s '14 s-an $120,000.....1915-1954

VENICE.
This city is in Los Angeles County. Incorporated Feb. 17, 1904.
BONDED DEBT March '14.....$ 68,000
Sinking fund 2,136
Assessed valuation '13-'14..... 11,716,659
(Assessment about 60% actual value.)
City tax (per $1,000) '13.....$10.00
Population in 1914 (est.)..... 6,500
INTEREST at First National Bank, Venice.

VENICE CITY SCHOOL DIST.
Building Bonds.
5s .....$92,000.....
BONDED DEBT April '14.....$ 102,000
Assessed valuation '13..... 7,334,000
INTEREST at County Treasurer's office.

VENICE UNION HIGH S. D.
Building Bonds.
5s '13 F-A $250,000.....Aug 1 '19-'52

VENTURA COUNTY.
Ventura is the county seat.
Court-House Bonds.
5s g '12 F-A $140,000c.....Feb 1 '15-'42
Bridge Bonds.
5s '11 F-A $252,000c.....Feb 1 '15-'42
BONDED DEBT Sept 20 1914...$ 392,000
Assessed valuation '14 (3-5 act.)... 30,971,620
State & Co. tax { Inside 13.00
(per $1,000) '13 { Outside..... 16.00
Population in 1910..... 18,347
INTEREST at County Treasurer's office.

VENTURA UNION HIGH S. D.
Building Bonds.
5s g '11 J-J $66,000c.....1915-1936
BONDED DEBT Sept 20 '14.....$ 66,000
Assessed valuation '14-'15 (3-5 act.) 7,455,535
School tax rate (per $1,000) '14-'15 3.40
Population in 1913 (est.).....6,000
INTEREST at County Treasurer's office.

VISALIA.
County seat of Tulare County. Incorporated Feb. 27, 1874. Bonds are taxable.
School Bonds.
6s July $5,750c.....1937
Sewer Bonds.
5s J-J $54,000c.....1940
Sewer, Bridge and City-Hall Bonds.
5s J-J $128,100c.....1948
BONDED DEBT Sept 21 '14.....$ 187,850
Assessed valuation '14 (3-5 act.)... 3,608,335
Total tax rate (per $1,000) '14..... 14.40
Population in 1910..... 4,831
INTEREST at First Nat. Bank, Visalia.

VISALIA HIGH SCHOOL DIST.
5s '12 .... $19,000.....
6s '10 .... 50,000.....

WHITTIER.
City is in Los Angeles County. Incorporated Feb. 21, 1898.
Water-Works Bonds.
5s g J-J $25,000c.....Jan 1 '15-'39
5s g '05 J-D 85,250c.....June 1 '15-'45
5s M-S 3,250c.....Mch 1 '15-'40
Sewer Bonds.
5s '09 A-O $96,250c.....June 1 '15-'49
Fire and Reservoir.
5s A-O $3,500c.....Apr 1 '15-'42
BONDED DEBT Sept 30 '14.....$ 213,250
Floating debt 5,126
Sinking fund 21,539
Assessed valuation '14 (½ actual).. 3,986,631
City tax rate (per $1,000) '14..... 16.10
Population, 1910 4,550
INTEREST at City Treasurer's office.

STATE OF OREGON.

ITS

DEBT, RESOURCES, ETC.

Organized as a Territory (Act Aug. 14 1848)..Aug. 14 1848
Admitted as a State (Act Feb 14 1859).....Feb. 14 1859
Total area of State (square miles).....96,030
State Capital .....Salem
Governor (term expires in January 1915).....Oswald West
Secretary of State (term expires Jan. 2 1917).B. W. Olcott
Treasurer (term expires Jan. 2 1915).....T. B. Kay

LEGISLATURE meets biennially in odd years on the second Monday in January, and there is no limit to length of sessions; but members of the Legislature can draw pay only for 40 days' services in the aggregate.

HISTORY OF DEBT.—For the early history of Oregon's State debt see Commercial and Financial Chronicle's "State and City Supplement" of April, 1893, page 146.

Today Oregon has no bonded debt.

On Jan. 1, 1914, the amounts held in the irreducible trust funds were as follows: School fund, $6,405,950.64; Agricultural College fund, $202,113.99; and University fund, $103,635.96. On the same date the cash on hand amounted to $710,314.14.

VALUE OF TAXABLE PROPERTY AND TAX RATE.—

Years	Taxable Property	Tax per $1,000	Years	Taxable Property	Tax per $1,000
1913	$954,282,374	$4.36	1903	$173,559,889	$7.06
1912	905,011,667	1.20	1902	148,099,602	5.13
1911	890,644,164	3.44	1900	117,804,874	5.70
1910	844,887,708	1.64	1895	144,445,426	4.80
1909	694,727,632	2.20	1890	114,077,788	4.34
1908	598,133,963	2.13	1885	77,188,694	3.10
1907	581,558,918	1.98	1880	48,483,174	7.00
1906	427,379,978	2.39	1875	41,436,086	...
1904	188,058,281	5.45			

DEBT LIMITATION.—Constitutional inhibitions as to the creation of debt are all found in Article XI., sections 5 to 10 inclusive, of the Constitution of 1857. We quote these sections in full.

SECTION 5.—*Restrictions upon Municipal Corporations.*—Acts of Legislative Assembly incorporating towns and cities shall restrict their power of taxation, borrowing money, contracting debts and loaning their credit.

SECTION 6.—*State not to be Stockholder in Company.*—The State shall not subscribe to or be interested in the stock of any company, association or corporation.

SECTION 7.—*Credit of State not to be Loaned—Limitation upon Powers of Contracting Debts.*—The Legislative Assembly shall not lend the credit of the State nor in any manner create any debt or liabilities which shall singly or in the aggregate, with previous debts or liabilities, exceed the sum of fifty thousand dollars, except in case of war or to repel invasion or suppress insurrection, or (according to an amendment of 1912) to build and maintain permanent roads; and the Legislative Assembly shall not lend the credit of the State nor in any manner create any debt or liahilities to build and maintain permanent roads which shall singly or in the aggregate, with previous debts or liabilities incurred for that purpose, exceed two per cent of the assessed valuation of all the property in the State; and every contract of indebtedness entered into or assumed by or on behalf of the State in violation of the provisions of this section shall be void and of no effect.

SECTION 8.—*State not to Assume County Debt, Except in What Case.*—The State shall never assume the debts of any county, town or other corporation whatever, unless such debts shall have been created to repel invasion, suppress insurrection or defend the State in war.

SECTION 9.—*Prohibition upon Municipal Corporations.*—No county, city, town or other municipal corporation, by vote of its citizens or otherwise, shall become a stockholder in any joint-stock company, corporation or association whatever or raise money for or loan its credit to, or in aid of, any such company, corporation or association.

SECTION 10—*Limitation upon Powers of County to Contract Debts.*—No county shall create any debts or liabilities which shall singly or in the aggregate, with previous debts or liabilities, exceed the sum of five thousand dollars, except to suppress insurrection or repel invasion, or (according to constitutional amendment of 1910) to build and maintain permanent roads within the county; and debts for permanent roads shall be incurred only on approval of a majority of those voting on the question, and (according to an amendment adopted in 1912) shall not either singly or in the aggregate with previous debts and liabilities incurred for that purpose, exceed two per cent of the assessed valuation of all the property in the county.

It will be seen from the above that the power to limit the indebtedness of municipalities has been relegated to the Legislative Assembly. In 1903 the Legislature, acting under this authority, passed the following Act, Section 2722 of Bellinger & Cotton's Annotated Codes and Statutes:

The common council (of cities and towns) shall not in any manner create any debt or liability which shall singly or in the aggregate exceed the sum of two thousand five hundred dollars without first obtaining authority from the Legislative Assembly of this State to contract a debt or liability in excess of said sum.

The above limitation does not apply to bonds issued in anticipation of the collection of street and sewer assessments under the authority of any charter of any city of 2,500 or more inhabitants. See sections 2727 to 2735 of the Annotated Codes and Statutes.

As regards school districts, the general school law as amended by the State Legislature in 1901 (Bellinger & Cotton's Code, section 3389, paragraph 31) gives permission to school boards to issue bonds (prescribing the method) without special legislation, but stipulates that "in no case shall the aggregate of bonded debt in any school district exceed five per centum of the value of the taxable property of any such district." Further provision is made (Section 3415 of the Code) that the indebtedness of districts of the first class (those having over 1,000 children of school age) located in cities of over 75,000 inhabitants shall never exceed $100,000—the 5% limit mentioned above applying to all districts of under 75,000 inhabitants.

TAXATION OF MUNICIPAL BONDS.—No legislation has been enacted, we were advised Dec. 12, 1911, by the Board of State Tax Commissioners, exempting from taxation bonds or other obligations of the State or its counties and municipalities.

POPULATION OF STATE.—The population of Oregon has been as follows in the years named:

1910	672,765	1890	313,767	1870	90,923	1850	13,294
1900	413,536	1880	174,768	1860	52,465		

(Compiled by the Commercial and Financial Chronicle.)

ALBANY.

This city is in Linn County.
6a J-D $20,000.....June 1 1915
Refunding Bridge & Sewer Bonds.
5s A-O $75,000c..... 1923
Sewer Bonds.
5s '13 J-J $18,000.....Jan 1 1928
(Subject to call after Jan 1 1923.)
BONDED DEBT July 1913.....$ 113,000
Paving bonds (add'l) 123,043
Warrants outstanding 46,642
Sinking fund 7,200
Assessed valuation 1912..... 3,527,850
Real value (est.) 7,000,000
City tax rate (per $1,000) 1911..... 8.00
Population in 1910..... 4,275
INTEREST at fiscal agency in New York.

ASHLAND.

This city is in Jackson County. Bonds are tax-exempt.
Sewer Bonds.
4½s '04 A-O $13,000c.....Apr 1 '15-'27
Fire Protection Bonds.
.....$5,000 .....
Refunding Water Bonds.
5s '09 J-J { $10,000c.....July 1 '15-'16
{ 30,000c.....July 1 1929
(The $30,000 is subject to call after '19.)
Water Bonds.
4½s '05 J-J $23,000c.....July 1 1920
Street (Red. after 1 year from issue.)
6s '11 A-O $15,500c.....Apr 1 1921
6s '09 M-S 12,000c.....Sept 1 1919
6s '10 J-J 24,000c.....July 1 1920
Electric Light Bonds.
4½s '08 M-S $40,000c.....Sept 1 '14-'29
4½s '09 J-J 30,000c.....Jan 1 1929
(Subject to call after Jan 1 1919.)
5a g '10 J-J $25,000c.....July 1 1930
(Subject to call after July 1 1920.)
Septic-Tank Bonds.
6s g '11 M-S $7,000c.....Mch 10 1921
(Subject to call after March 1 1912.)
GEN. BD. DT. June 15 '14.....$ 76,500
Water and light debt (add'l)..... 163,000
Assessment debt (add'l)..... 204,298
Assessed val. '13 (3-5 act.)..... 2,880,640
Total tax rate (per $1,000) '13..... 38.50
Population 1910 5,020
INTEREST payable in Ashland at Granite Sav. Bank, Citizens' Banking & Trust Co., U. S. Nat. Bank and First Nat. Bank.

ASHLAND SCHOOL DISTRICT No. 5.

5s s-a $7,000r.....Sept 1 1919
(Subject to call Sept 1 1909.)
5s J-J $10,000r..... 1924
(Subject to call any time.)
5s '11 J-J $75,000r.....Jan 1 1931
(Subject to call $25,000 in 10 years and $25,000 in 15 years.)
BONDED DEBT Sept 21 '14.....$ 97,000
Assessed valuation '13 (3-5 act.)..... 3,488,165
School tax (per $1,000) 1913..... 8.70
Population in 1914 (est.)..... 7,000
INTEREST payable at Nat. Park Bank, N. Y. City, or in Ashland.

ASTORIA.

Astoria is in Clatsod County. Incorporated 1865. Commission government rejected Dec. 13, 1911.
Funding Bonds. (x)
6s g A-O $90,000c.....Apr 1917
Refunding Bonds. (†)
5s '11 M-N $50,000c.....Nov 1 1931
Water Bonds. (*)
5s & 6s J-J $300,000c.....1922 & 1925
5s g '11 s-a 45,000c.....1931
Bulkhead (Red. beg. Dec. 1923).
5s g '13 J-D $100,000c.....Dec 1 1953
Dam and Reservoir Bonds. (*)
5s g '12 J-J $80,000c.....Jan 1 1932
BONDED DEBT Sept 19 '14.....$ 665,000
Assessed valuation '14..... 7,566,019
Total tax (per $1,000) '13..... 44.00
Population in 1910 9,599
INTEREST on bonds marked (*) at Chase National Bank, N. Y.; (x) at Kountze Bros., N. Y. City; (†) at National Park Bank, N. Y.

ASTORIA SCHOOL DISTRICT NO. 1

6s '91 J-J $ 5,000c.....July 1 1921
5s '10 J-D 75,000 .....June 1 1930
(Subject to call after June 1 1920.)
Building Bonds. (Red. beg. July 1 '24.)
5s '14 J-J $20,000.....July 1 1934
Refunding Bonds.
5s '03 F-A $27,000c.....1923
(Subject to call after Aug 1 1913.)
5s '04 A-O $12,000c.....Apr 1 1924
(Subject to call after April 1 1905.)
BONDED DEBT Sept '14.....$ 120,000
Assessed valuation '13 (3-5 act.).. 5,154,968
School tax (per $1,000) '13..... 8.50
Population in 1914 (estimated)..... 15,000
INTEREST on issues of 1891 and 1910 payable in New York; on refunding bonds at office of County Treasurer.

BAKER CITY.

County seat of Baker County. Incorporated 1874. Commission government was adopted Oct. 3, 1910. All bonds are tax-exempt.
Sewer Bonds.
5s '03 J-J $12,000c.....July 1 1923
Water Bonds.
5s g '00 J-J $100,000c.....July 1 1920
5s '01 M-S 20,000c.....Sept 3 1921
5s '02 A-O 45,200c.....Apr 2 1922
5s '05 A-O 10,000c.....Apr 30 1927
5s g '11 J-J 90,000c.....July 1 1921
5s '14 M-S 98,851c.....Mar 1 1934
Refunding Water Bonds.
5s '10 A-O $25,000c.....April 4 1930
Reservoir Bonds.
5s g '11 J-J $25,000c.....July 1 1921
New City Hall Bonds.
5s '03 J-J $46,000c.....July 1 1923
5s g '04 J-D 12,000c.....Dec 21 1924
Street Intersection Bonds.
5s g '11 J-J $23,500c.....July 1 1931
5s '12 .. 5,503.72.....
5s '13 ... 8,826.36.....
Electric-Light Bonds.
5s g '13 J-D $25,000.....Dec 1 1933
GEN. BONDED DEBT July 1 '14$ 546,830
Assessment debt (additional)..... 200,103
Sinking Fund 45,000
Assessed valuation '13 (abt. act.).. 5,768,060
Population 1910 6,742
INT. payable in Baker City and N. Y.

BAKER CITY SCHOOL DISTRICT NO. 5

..s '88 ... $20,000.....
..s '99 ... 15,000.....
..s '01 ... 15,000.....
School Bonds (Red. begin in 1916).
5s g '08 J-J $20,000c.....1926
Heating and Sanitary Plant Bonds.
5s '09 s-a $25,000c.....1929
(Subject to call after 1919.)
Ref. Bonds (Red. beg. in 1921).
5s '11 J-D $45,000.....June 1 1931
BONDED DEBT Apr 1 '14.....$ 92,000
Assessed valuation '13 (30% act.). 6,362,000
School tax (per $1,000) '13..... 7.00
Population in 1910 (estimated).....8,000
INTEREST payable in Baker City or N. Y.

CLATSOP COUNTY.

Astoria is the county seat. Bonds below declared valid by State Supreme Court..
Road Bonds.
5s '14 A-O $400,000.....Apr 1 1934
BONDED DEBT Sept 19 '14....$ 400,000
Assessed valuation '13..... 18,067,830
Total cash valuation..... 24,086,677
Population in 1910.....16,106
INTEREST at State fiscal agency in N. Y. City or at County Treasurer's office.

COLUMBIA COUNTY.

St. Helens is the county seat.
Road Bonds.
5s g '14 A-O { $ 60,000c.....Apr 1 1919
{ 300,000c .....Apr 1 '24-29-34
BONDED DEBT Apr '14.....$ 360,000
Assessed valuation '13..... 18,067,830
Total cash valuation..... 24,086,677
Population in 1910.....10,580
INT. at offi. of Co. Treas. or in N. Y. City.

CORVALLIS.

This city is in Benton County.
Water Bonds (Red. beg. in 1916).
5s '06 J-J $75,000.....Jan 2 1936
5s '14 A-O 7,000.....Apr 1 1954
Sewer Bonds.
5s '10 J-J $144,000.....July 1 1950
Fire-Department Bonds.
5s '10 J-J $16,000.....July 1 1950
Street-Improvement Bonds.
5s '10-'11.... $28,746.51.....40 years
Bridge Bonds.
5s '13 J-J $2,500.....Jan 1 1953
Refunding Bonds.
5s '13 J-J $51,397.08.....1953
GEN. BONDED DEBT Jan 27 '13.$ 242,644
Water debt (additional) 75,000
Assessment bonds (additional)..... 135,515
Warrant debt 51,397
Assessed valuation '13..... 2,273,749
Actual value (estimated)..... 4,500,000
Tax rate (per $1,000) '12..... 35.70
Population in 1910.....4,652
While the water bonds are direct liabilities of the city, provision is made in the law for fixing the rate annually at a sum sufficient to cover the expenses, pay interest on bonds and provide a sinking fund that, by annual retirement, will pay the bonds in full at maturity.

DALLES CITY.

This city (P. O. The Dalles) is in Wasco County.
Sewer Bonds.
5s '12 J-J $65,000c.....July 15 1933
6s M-N 8,250c.....1924
Sidewalk and Improvement Bonds.
6s J-D $6,700.....1924
Water Bonds.
6s '91 J-D $25,000c.....June 30 1916
5s '03 M-N 50,000c.....Nov 1 '17-'26
Refunding Bonds.
4s '95 M-N $54,500c.....May 1 1920
City Hall Bonds.
6s '08 M-N $28,900c.....May 1 1918
General Improvement Bonds.
5s '13 .... 12,000.....1933
Street Bonds.
6s F-A $ 9,000c.....1920
6s M-S 16,000c.....1920
6s J-D 8,400c.....1920
Street and Sewer Bonds.
6s M-N $45,000c.....1924
GEN. BD. DEBT Sept 24 '14.....$ 156,650
Water bonds (additional)..... 75,000
Assessment debt (additional)..... 85,100
Sinking fund Aug 31 '14..... 95,887
Assessment valuation '13 (70% act.) 4,211,000
Total tax (per $1,000) '13..... 25.25
Population 1910 6,834
INTEREST on bonds of 1912 payable at State fiscal agency in N. Y.; other interest at San Francisco, Cal., N. Y. Security & Trust Co., N. Y., and at City Treasurer's office.

EUGENE.

The city is in Lane County. Incorporated in 1864. The city owns property valued at $842,000.
Refunding Bonds.
5s '10.... { $50,000c .....Aug 1 1915
5s '11 J-D { 100,000c .....Aug 1 '20 & '30
{ 130,000c .....Dec 1 1936
Sewer Bonds.
4s '03 .... $ 6,000c.....Oct 20 '15 & '18
4s '05 .... 5,000c.....Oct 20 '15 & '18
5s '12 M-S 183,500c.....Sept 1 1942
Paving Bonds.
5s '12 s-a 50,000c.....June 1 1922
6s '13 J-J 25,000c.....July 1 1923
6s '14 F-A 43,950c.....Feb 1 1924
(Subject to call after Feb 1 1915.)
6s '14 J-D $20,100c.....June 1 1924
(Subject to call after June 1 1915.)
Water Bonds.
5s '08 .... $300,000c.....Jan 1 1948
5s '10 .... 60,000c.....'20, '30 & '40
5s '14 .... 100,000c 1939
Electric-Light Bonds.
6s '11 s-an $25,000c.....Oct 1 1921
Light, Power and Water Bonds.
5½s '11 J-D $57,000c.....Dec 1 1926
City-Hall-Site Bonds.
5s '12 .... $15,500c.....July 1 1922
Armory Building Bonds.
5s '14 July $25,000.....July 1 1924
TOT. BD. DEBT July 19 '14.....$ 1,185,430
Bancroft bonds (incl)..... 153,430
Water and power bonds (incl).... 442,000
Floating debt Apr 1 '14..... 46,523
Sinking funds and cash..... 135,295
Assessed valuation '13 (equalized) 9,347,813
Real value (estimated)..... 12,000,000
City tax rate (per $1,000) '13.... 12.50
Population 1910.....9,009

EUGENE SCHOOL DISTRICT NO. 4.

Site and Building Bonds.
4s s-a $18,500r.....1921
4s s-a 32,000r.....1924
4½s s-a 40,000c.....1929
5s '13 J-J 20,000c.....Jan 1 1933
(Subject to call beginning Jan 1 1923.)
5s '14 M-N $110,000.....May 1 1934
(Subject to call after May 1 1924.)
BONDED DEBT May '14.....$ 220,500
Assessed val. '13 (real & pers.)... 9,347,813
Real valuation (estimated)..... 11,684,760
Population in 1914 (estimated).....14,000
INTEREST on 1914 bonds at State fiscal agency in New York City.

GRANT'S PASS.

This city is in Josephine County.
$200,000 railroad bonds given below upheld by State Supreme Court on April 28, 1914.
Sewer Bonds.
5s ... $19,000.....1940
Fire Auto Bonds.
6s ... $5,500.....1921
Warrant-Funding Bonds.
5s '12 A-O $80,000.....Apr 1 1932
Municipal R. R. Bonds.
6s '14 J-J { $ 15,000 1939
{ 100,000 1940-1943
{ 85,000 1944
BONDED DEBT Sept 22 '14.....$ 304,500
Warrant debt Sept 1 '14..... 2,392
Assessed valuation '13..... 3,000,000
Real valuation..... 6,500,000
Population in 1910.....3,980
INTEREST payable at City Treas. office.

HOOD RIVER

This city is in Hood River County.
Water Bonds.
5½s '12 J-J $36,000c.....July 1 1922
Street-Improvement Bonds.
6s '13 J-D $10,805.36.....Dec 22 1923
(Subject to call any interest paying period after one year.)
GEN. BD. DEBT Sept 19 '14....$ 126,000
Assessment debt (additional)..... 116,420
Sinking fund (cash)..... 13,419
Assessed valuation '13..... 2,184,151
Approximate value 3,375,626
Population in 1910.....2,331

HOOD RIVER IRRIGATION DISTRICT.

A district in Hood River County.
Completion Bonds.
6s g '11 ... $170,000c.....1922-1931
BONDED DEBT Apr 26 '12.....$170,000
Assessed valuation (¾ act.) '11.... 950,000
District tax (per $1,000) '11..... 13.00
INTEREST in Portland, Chicago or N. Y. City at National Park Bank.

JACKSON COUNTY.

Jacksonville is the county seat.
Road Bonds.
5s '13 M-N $500,000c.....Nov 1 1933
BONDED DEBT Sept 1 '14.....$ 500,000
Warrant debt 473,720
Assessed valuation '14 (estimated). 36,000,000
Tax rate (per $1,000) '13..... 15.00
Population in 1910.....25,756
INTEREST payable at fiscal agency of State of Oregon in N. Y. City.

KLAMATH FALLS.

This city is in Klamath County.
First incorporated in 1889.
City Hall Bonds.
5s '14 A-O $50,000c.....Apr 1 1934
BONDED DEBT Mar '14.....$ 176,793
Sinking fund 3,000
Assessed valuation '13 (abt. act.).. 2,906,893
City tax (per $1,000) '13..... 13.25
Population in 1910.....2,758
INTEREST on bonds of 1914 at fiscal agency in N. Y. City.

LA GRANDE.

This city is in Union County. Incorporated Feb. 23, 1885. Commission government approved Oct. 1, 1913.
5s '08 F-A $160,000c.....1929
(Subject to call after 1918.)
City Hall Bonds (Red. beg. in 1914).
5s '04 J-J $25,000c.....1924
Sewer (Red. after 10 years from issue).
5s '10 ... $40,000c.....Feb 1 1930
5s '11 J-J 10,000c.....Jan 1 1931
Ref. Water (Red. beg. in 1920).
5s '10 s-a $49,000c.....Jan 1 1930
GEN. BONDED DEBT Mar '14..$ 284,000
Assessment debt (additional)..... 328,311
Floating debt..... 109,000
Sinking fund..... 40,000
Assessed valuation '13 (¾ act.).... 3,500,000
City tax rate (per $1,000) '13..... 18.50
Population 1910 4,843

(Compiled by the Commercial and Financial Chronicle.)

LA GRANDE—Concluded.

INTEREST on refunding water bonds is payable at A. B. Leach & Co., N. Y.; on city-hall bonds in Portland, and on sewer bonds at E. H. Rollins & Sons, Boston.

LA GRANDE SCHOOL DISTRICT NO. 1.

Bonds all subject to call 10 years before maturity.

High-School Bonds.

5s g J-D $ 8,000c.....1919
5s g A-O 4,000c.....1920
5s g J-D 12,000c.....1925
5s g '10 M-N 75,000c.....May 2 1930

School-Site and Building (Tax-exempt).

5s g '13 A-O $30,000c.....Apr 1 1933

BONDED DEBT Sept 19 '14.....$ 127,000
Assessed valuation '12 (¾ act.).... 3,279,930
School tax rate (per $1,000) '13.... 12.00

INTEREST on bonds of 1913 is payable at National Park Bank, N. Y. City; on other bonds at County Treasurer's office in La Grange.

McMINNVILLE.

This city is in Yamhill County. Incorp. 1882. City owns and operates local water and light plant. Bonds are exempt from city tax.

Park Bonds.

5s '08 J-J $9,400c.....Jan 1 1928
(Subject to call after Jan. 1 1913.)
5s '10 J-D $3,000c.....June 1 1928

Street Bonds (*General*).

6s '14 J-J $27,000c.....July 1 1924
6s '14 12,500..... 1924
(Subject to call after one year.)

Water-Main Bonds.

6s '12 J-J $13,000c.....July 1 '14-'28

Water and Light Bonds.

4½s '04 M-N $20,000c.....Nov 1 1924
(Subject to call Nov. 1 1919.)
5s '06 J-J $45,500c.....Jan 1 1931
(Subject to call Jan. 1 1921.)
5s '08 A-O $20,000c.....Oct 1 1928
5s '08 M-N 10,000c.....Nov 1928
5s '10 M-S 30,000c.....Mar 1 1930
6s '12 J-J 25,000c.....Jan 1 1932
(Subject to call after Jan. 1 1927.)

BOND DEBT Sept 1914.....$ 194,100
Assessment debt (add'l)..... 28,500
Floating debt 5,000
Sinking fund (conditional)..... 10,000
Assessed val. '13 (½ act.)..... 1,402,000
Total tax (per $1,000) 1913..... 38.00
Population in 1910..... 2,400

INTEREST on 4½s at office of City Treas.; on 5s at U. S. Nat. Bank in Portland; on bonds of 1912 at fiscal agency of Oregon in New York.

MARSHFIELD.

This city is in Coos Co. Inc. 1874.

TOTAL DEBT Apr 1 '14.....$ 156,778
Spec. impt. bonds (incl.)..... 102,778
Sinking funds 15,570
Assessed valuation 1913..... 2,602,259
Population in 1910..... 2,980

MEDFORD.

This city is in Jackson County. Incorporated as a town Feb. 24, 1885, and as a city Feb. 6, 1901. Re-incorporated (new city charter) Feb. 7, 1905.

Water Bonds (*Tax-exempt*).

5s '07 M-S $45,000c.....Mar 1 1917
5s '08 J-J 355,000c.....July 1 '23-'38

City Hall, &c., Bonds (*Tax-exempt*).

6s '08 F-A $25,000c.....Feb 1 1918

Refunding Bonds (*Tax-exempt*).

5s '10 F-A $30,000c.....Aug 1 1930

Fire Apparatus, &c., (*Tax-exempt*).

5s '11 A-O $38,000c.....Apr 1 1921

Bridge Bonds (*Tax-exempt*).

5s '12 A-O $20,000c.....Oct 1 1932

GEN. BD. DEBT Sept 1 '14.....$ 513,000
Water debt (included)..... 400,000
Assessment debt (add'l)..... 780,000
Sinking fund 44,892
Assessed val. '13 (60% act.)..... 5,608,090
Total tax rate (per $1,000) '13.... 37.00

INT. on water bonds due 1917 in Medford; bridge, city-hall and refunding bonds in N. Y.; all others in Chicago.

MORROW COUNTY S. D. No. 1.

P. O. Heppner.

5½s '12 J-J $40,000c.....July 1 1932
(Subject to call beginning July 1, '22.)

BONDED DEBT Mar 20 '13.....$ 48,000
Cash in sinking fund..... 2,777
Assessed valuation 1911..... 1,123,693

INT. at State fiscal agency in N. Y.

NEWBERG.

This city is in Yamhill Co. Inc. Feb. 21, 1889.

Water Bonds.

6s '97.....$15,000.....Jan 1 1917
4½s '06..... 15,000.....June 1 '21 & '27

Sewer Bonds.

5s '11.....$80,000.....Jan 1 1931

Improvement Bonds.

6s '13 M-N $38,489.48.....Nov 1, 1923
(Subject to call after Nov. 1 1914.)

Water and Sewer Bonds.

5s '12.....$22,000.....Jan 1 1932

GEN. BONDED DEBT Jan '14.....$150,000
Assessment debt (add'l)..... 64,902
Floating debt 17,010
Assessed valuation 1913..... 921,989
Tax rate (per $1,000) 1913..... 13.00
Population in 1910..... 2,260

INT. at First Nat. Bank, Newberg.

OREGON CITY.

This city is in Clackamas County.

Refunding Bonds.

5s .....$30,000.....1925
5s ..... 20,000.....1933
5s ..... 50,000.....1933

BONDED DEBT Sept 1914.....$ 100,000
Assessed valuation 1911..... 2,608,000
Tax rate (per $1,000) 1913..... 10.00
Population in 1910..... 4,287

PENDLETON.

This city is in Umatilla County. Incorp. Oct. 25 1880. All bonds are tax-exempt to residents of State. Commission government defeated Dec. 1, 1913.

General Bonds (Red. beg. after 20 years from date).

5s '09 J-J $75,000c.....July 1 1929

Water-Works Bonds.

5s '99 J-J $45,000c.....July 1 1929
5s '13 J-J $200,000.....July 1 1943
5s '14 J-J 40,000.....July 1 1944

Levee Bds. (Red. after 20 yrs. from issue).

5s '06 M-N $10,000c.....Nov 30 1936
5s '07 F-A 67,000c.....Aug 1 1937

Sewer (Red. after 20 years from issue)....

5s '03 J-J $30,000c.....July 1 1933
5s '08 F-A 10,000c..... 1938

Street Bonds.

5s '08 F-A $18,000c..... 1938

City-Hall and Jail Bonds.

5s '08 F-A $40,000c..... 1938

BONDED DEBT Mar 1914.....$ 495,000
Assessed valuation '13..... 5,024,386
Total tax rate (per $1,000) '13..... 25.00
Population in 1910..... 4,460

INT. at City Treas. office. Harris Tr. & Sav. Bk., Chicago, and Kountze Bros., N. Y.

PENDLETON SCHOOL DISTRICT No. 16.

4½s '11 A-O $100,000.....1931
(Subject to call after 1921.)

Building Bonds (*Tax-exempt*).

4½s J-J $60,000c.....1924

BONDED DEBT Sept 19 '14.....$ 160,000
Assessed valuation '13 (3-5 act.).... 5,582,250
School tax (per $1,000) 1913..... 9.00
Population in 1911 (est.)..... 5,000

INTEREST at Nat. City Bank, N. Y.

PORTLAND, A. L. Barbur, Auditor.

Portland is the county seat of Multnomah County. Commission government adopted May 3, 1913, and upheld by State Supreme Court on May 28, 1913. The cities of Portland, East Portland and Albina were consolidated in June, 1891. Attempted consolidation of Portland and St. Johns held illegal by State Supreme Court, March 26, 1912.

Dock Bonds.

4½s g '11 M-N $500,000c.....Nov 1 1961
(Subject to call after Nov 1 1941.)
4½s g '13 M-N $2,150,000.....May 1 1943
4½s g '14 A-O 100,000.....Oct 1 1939

Bridge Bonds.

5s g '92 J-J $500,000c.....Jan 1 1922
5s g '95 A-O 200,000c.....Apr 1 1925
4s g '04 J-J 400,000c.....Jan 1 1934
4s g '09 J-J 450,000c.....Jan 1 1939
4s g '10 J-J 250,000.....July 1 1940
4s g '11 J-J 500,000c.....Jan 2 1941
4s g '11 M-S 600,000c.....Sept 1 1941
4s g '12 A-O 315,000c.....Oct 1 1942
4s g '13 .... 55,000c..... 1943

City Hall Bonds.

5s g '90 J-J $175,000c.....Jan 1 1920
5s g '92 J-J 500,000c.....July 1 1922

General Bonds.

6s g '91 J-D $40,000c.....June 1 1921

Park and Boulevard Bonds.

6s 6 '91 J-D $ 50,000c.....June 1 1921
4s g '08 J-D 500,000c.....Dec 1 1933
4s g '11 J-J 250,000c.....July 1 1936
4s g '12 A-O 250,000c.....Oct 1 1937

Water Bonds.

6s g '91 M-N *$250,000c.....May 1 1921
5s g '87 J-J* 700,000c.....Jan 1 1917
5s 6 '93 J-J* 2,200,000c.....July 1 1923
4s g '09 J-J 250,000c.....Jan 1 1934
4s 5 '10 J-D 500,000c.....June 1 1935
4s g '10 M-S 500,000c.....Sep 1 1935
4s g '11 J-J *500,000c.....Jan 2 1936
4s g '11 M-S *500,000c.....Mch 1936
4s g '11 A-O *500,000c.....Oct 1 1936
4s g '12 M-S *500,000c.....Mch 1 1937
4s g '12 M-N *200,000c.....Nov 1 1937
4s g '13 M-N 100,000c.....May 1 1938
4s g '13 F-A 75,000c.....Aug 1 1938
4s g '13 .... 250,000c..... 1938
4s g '14 F-A 175,000c.....Feb 2 1939

Boulevard Bonds.

6s g '91 J-D $50,000c.....June 1 1921

Ferry Bonds.

5s g '93 A-O $50,000c.....Apr 1 1923
5s g '03 J-D 15,000c.....Dec 1 1933
4s g '04 J-J 50,000c.....Jan 1 1934

Funding Bonds.

5s g '98 J-D $430,000c.....Dec 1 1928

Electric Light Bonds.

6s g '91 M-N $50,000c.....May 1 1921

Crematory Bonds.

5s g '10 M-S $35,000c.....Sept 1 '14-'20
5s 52,200 .....

Refunding Bonds.

4s g '03 M-N $56,500c.....May 1 1928

Fire-Boat Bonds.

4s g '11 J-J $125,000c.....July 1 1936

Municipal Jail Bonds.

4s g '11 M-N $200,000.....Nov 1 1931

Auditorium Bonds.

4s g '13 ... $35,000c..... 1943

GEN. BONDS Sept 1 '14.....$16,074,100
Improvement debt 15,177,932
TOTAL DEBT Sept 1 '14..... 31,252,032
Water debt (included)..... 7,699,000
Warrants outstanding June 1 '14.. 682,610
Assessed valuation, real.....241,678,410
Assessed valuation, personal..... 45,383,580
Assessed val., pub. serv. cor..... 27,043,787
Total val. '13 (¾ actual).....314,105,777
City tax rate (per $1,000) '13..... 7.70
Population in 1910..... 207,214

*These bonds are payable, principal and interest, from the water rates, not from taxation.

The improvement bonds are issued on account of street improvement, sewer, street extension and water-main assessments and, according to the city charter, are not included in the 7% debt limit.

INT. on dock bonds of 1913 at City Treasurer's office or at fiscal agency of city in N. Y. City; on others at Chase Nat. Bk., N. Y., with exception of one issue, which is payable at Chemical Nat. Bank, N. Y.

CITY PROPERTY.—The city owned property on Sept 1 '14 valued at $26,338,068, including the water works, which are valued at $13,682,696. Receipts of water works from Dec 1 '13 to Aug 30 '14 $1,087,364; operating expenses (including interest), $1,104,276.

PORTLAND SCHOOL DISTRICT No. 1.

District No. 31 Bonds.

6s '91 J-D $10,000c.....June 1 1916

District No. 1 Bonds (All redeemable 10 years before maturity).

4½s '08 A-O $250,000c.....Oct 1 1928
4½s g '10 A-O 350,000.....Oct 1 1930
4½s '12 J-D 150,000.....Dec 2 1932

District No. 12 Bonds.

6s '05 M-S $6,000c.....Sept 1 1915

BONDED DEBT Sept '14.....$ 770,000
Sinking fund..... 55,044
Assessed valuation '13 (½ act.).. 316,180,443
School tax (per $1,000) '14..... 7.50
Population in 1914 (estimated).....247,000

INTEREST is payable in N. Y. City or Portland.

THE PORT OF PORTLAND.

Incorporated in 1891. Limits include consolidated City of Portland and approximately half area and 97% of valuation of the territory of Multnomah Co. Bonds are tax-exempt to residents.

River Improvement Bonds.

5s g J-J $350,000c.....Jan 1 1922

Dry Dock Bonds.

4s g J-J $185,000c.....July 1 1933
4s g J-J 215,000c.....Jan 1 1934

BONDED DEBT Sept '14.....$ 750,000
Sinking fund Mar 18 '14..... 207,290
Assessed valuation '13 (70% act.) 333,452,492
Tax rate (per $1,000) '13..... 1.85
Population of district '14 (estimated)..270,000

INTEREST at U. S. Nat. Bank, Portland.

PORT OF ASTORIA.

A district (P. O. Astoria) in Clatsop County. The bonds below are part of an issue of $800,000.

Municipal Harbor Bonds.

5s g '14 J-J { $150,000 .....1924 & 1929
{ 150,000 .....1934 & 1939
{ 100,000 1944

TOTAL DEBT Sept 23 '14.....$ 400,000
Assessed valuation '13 (3-5 act.).. 35,019,969
Population in 1910.....16,106

INTEREST at State fiscal agency in N. Y. City.

PORT OF COOS BAY.

P. O. Marshfield.

Series "A" Improvement Bonds.

5s g '13 J-J $600,000c.....Jan 1933-1956

BONDED DEBT Mch 1 '14.....$ 300,000
Assessed valuation '13..... 9,140,749
(Assess. abt. 1-5 to 1-4 act. value.)
District tax (per $1,000) '13..... 3.00
Population in 1914 (estimated) 15,000

INTEREST at Oregon fiscal agency in N. Y. (National Park Bank.)

PORT OF NEHALEM.

A district in Tillamook County.

Harbor Improvement Bonds.

6s g '10 J-J $ 30,000c.....July 1 '15-'20
6s J-J 235,000c 1927-1937
6s J-J 25,000c 1921-1926

BONDED DEBT July 1 '14.....$ 290,000
Assessed valuation '13 (35% act).. 3,810,000
Population in 1913 (estimated).....2,500

INTEREST on first two issues payable at Kountze Bros., N. Y.; on third issue at Nat. Park Bank, New York.

PORT OF SIUSLAW.

A district (P. O. Florence) in Lane County. Organized June 15 1909.

Harbor-Improvement Bonds.

5s '09 J-J $ 85,000c.....July 1 '19-'29
6s '11 J-J 115,500c.....July 1 '21-'31

BONDED DEBT Sept 22 '14.....$ 200,500
Assessed valuation '13 (½ act.).... 4,300,000

INTEREST pay. at Kountze Bros., N. Y.

PORT OF TILLAMOOK.

A district in Tillamook County.
Organized in 1899 by the Legislature.

Water-Front and Channel Bonds.

6s g '11 J-J $214,000.....July 1 '21-'31

Bar-Improvement Bonds.

6s g '11 J-J $236,000.....July 1 '21-'31

TOT. BD. DEBT May '13.....$ 450,000
Assessed valuation (½ act.) '11.... 7,270,000
Population 1912, (estimated).....3,000

INTEREST payable in Tillamook or at office of State's fiscal agent in N. Y.

PORT OF TOLEDO.

A district in Lincoln County.

Improvement Bonds.

6s '10 g J-J $50,000c.....Nov 1 1930
(Subject to call after Nov. 1 1920.)

BONDED DEBT Oct 16 '14.....$ 50,000
Assessed valuation '14 (½act.).... 1,388,246

INT. at Lincoln Co. Bk., Toledo, Ore.

ROSEBURG.

This city is in Douglas County. Incornorated Oct. 3, 1872. Population, 1910, 4,387.

Street and Bridge Bonds.

5s '09 .... $35,000.....1929

Street Bonds.

4½s '10 .... $40,000.....1930

ROSEBURG—Concluded.
Refunding Bonds.
5s '10 .... $25,000.....1930
GEN. BD. DEBT Sept 21 '14.....$ 100,000
Improvement bonds (additional)... 202,307
Assessed valuation '13..... 3,258,490
City tax (per $1,000) '13..... 8.00
INTEREST on street and bridge 5s and street 4½s at Douglas Nat. Bank, Roseburg; refunding bonds at Roseburg Nat. Bank, Roseburg and on improvement bonds at City Treasurer's office.

ST. JOHNS.
This city is in Multnomah County.
City-Hall Bonds.
6s '06 .... $10,000.....July 9 1916
City Dock Bonds.
6s '08 .... $60,000.....Apr 21,1928
Ferry Bonds.
6s '11 .... $6,000.....Mch 21 1921
GEN. BD. Debt Mar 18 '14.....$ 76,000
Improv. bonds (additional)..... 270,287
Assessed valuation '13..... 3,933,650
City tax (per $1,000) '13..... 9.00
Population in 1910.....4,872

SALEM.
This city, the capital of the State, is in Marion County. Incorporated Jan., 1857. Bonds are tax-exempt.
City owns property valued at $350,000.
Refunding Bonds.
5s '10 J-J $63,050r.....Jan 20 1920
(Subject to call after 1911.)
5s g '14 J-J $60,000.....Jan 1 1934
5s g '14 A-O 30,000.....Apr 1 '15-'24
Sewer Bonds.
5s '10 J-J $19,000r.....Jan 20 1920
(Subject to call after 1911.)
5s g '13 M-N $456,000.....May 1 '15-'33
Refunding Bridge Bonds.
6s '10 A-O $20,000c.....Oct 8 1920
GEN. BD. DEBT Sept 19 '14....$ 648,050
Improvement bonds (additional).. 485,226
Warrants outstanding..... 88,626
Cash on hand..... 125,133
Assessed valuation '13 (¾ act.).. 12,435,545
Total tax (per $1,000) '13..... 33.20
Population in 1910.....14,095
INTEREST on sewer bonds of 1913 at City Treasurer's office or at fiscal agency in N. Y.; on refunding 6s at Fourth National Bank, N. Y.; others in Salem.

SALEM SCHOOL DISTRICT NO. 24.
Bonds all redeemable 10 years before final maturity.
5s A-O $35,000r.....Oct 1 1930
5s M-N 15,225r.....Nov 1 1930
5s J-D 4,400r.....Dec 1 1930
Refunding Bonds.
5s '11 A-O $49,650r.....Apr 1 1931
BONDED DEBT Sept 21 '14.....$ 104,275
Note debt (additional)..... 25,000
Cash on hand..... 9,297
Assessed valuation '14..... 13,306,240
School tax (per $1,000) '14..... 7.30
INTEREST at Nat. Park Bank, N. Y.

TILLAMOOK SCHOOL DISTRICT.
A district in Tillamook County.
Building (Redeemable beginning in 1922).
6s '12 A-O $35,000.....Apr 1 1932
BONDED DEBT Sept 22 '14.....$ 35,000
Sinking fund..... 2,000
Assess. val. '14 (70% act.) est..... 3,000,000
School tax (per $1,000) '14..... 5.00
Population in 1914 (estimated).....7,500
INTEREST at Nat. Park Bank, N. Y.

WASCO CO. SCHOOL DISTRICT NO. 12.
P. O. The Dalles.
Building (Red. beginning Mar. 1, 1924).
5s '14 M-S $100,000.....Mar 4 1934
BONDED DEBT Oct 14 '14.....$ 120,000
Cash on hand (general fund)..... 15,632
Building fund 65,149
Assessed valuation..... 5,328,049
INTEREST at County Treasurer's office or at State fiscal agency in N. Y. City.

WASHINGTON CO. S. D. NO. 7.
Building Bonds (Red. beginning 1922).
5s '12 J-J $35,000.....July 1 1932
BONDED DEBT Nov '13.....$ 45,000
Assessed valuation '12..... 1,556,545
Real value (estimated)..... 2,500,000
Population in 1912 (estimated).....3,500
INTEREST at Equitable Trust Co., N. Y., or at County Treasurer's office, Hillsboro.

STATE OF WASHINGTON.
ITS DEBT, RESOURCES, ETC.

Organized as a Territory (Act March 2 1853)..March 2 1853
Admitted as a State (Act Feb. 22 1889).....Nov. 13 1889
Total area of State (square miles).....69,180
State Capital.....Olympia
Governor (term ends Wed. aft. 2d Mon. Jan.'17) Ernest Lister
Secretary (term ends Wed. aft. 2d Mon. Jan. '17) I M Howell
Treasurer (term ends Wed aft. 2d Mon. Jan. '17)..Ed. Meath
Auditor (term ends Wed. aft. 2d Mon. Jan. '17) C. W. Clausen

LEGISLATURE meets biennially in odd years on the second Monday in January. Sessions are limited to sixty days.

TOTAL DEBT—The State has no bonded debt against the general fund. There are outstanding, however, $206,024 Normal School Fund bonds and $87,000 Public Highway Fund bonds shown in detail below.

Normal School Fund Bonds.	*Public Highway Fund Bonds.
3s '09 J-D $206,024.June 10, 1924 (Subject to call after June 10 1914.	4s '11 F-A $87,000....Feb 1 1923 (Subject to call on any interest date, 10% ($12,500) annually.)

*If not paid by highway fund in 12 years from their date, these bonds will be paid out of general fund.

INTEREST is payable at the office of State Treasurer in Olympia.

ASSESSED VALUATION.—The following statement shows the total assessed valuation of the State for the years indicated. Real estate is valued only every two years. The State tax rate (per $1,000) for 1913 was $8.81.

Years.	Assessment.	Years.	Assessment.	Years.	Assessment.
1914....	$1,031,901,773	1907.....	$573,070,528	1900.....	$237,576,523
1913....	1,014,475,027	1906.....	530,209,882	1890.....	217,595,569
1912....	1,005,086,251	1905.....	328,542,525	1880.....	23,708,587
1911....	955,125,934	1904.....	298,460,979	1870.....	10,642,863
1910....	906,247,944	1903.....	276,988,569	1860.....	4,394,735
1908....	748,593,942				

EXEMPTION FROM TAXATION.—Act of Legislature, approved Feb. 28 1907, exempted mortgages, credits, notes, municipal securities, &c., from all taxation as personal property. Act upheld by State Supreme Court in 1908.

DEBT LIMITATION.—The State may, to meet casual deficits or failures in revenues, or for expenses not provided for, contract debts; but such debts in the aggregate shall not at any time exceed $400,000. The State may also incur debts to repel invasion, suppress insurrection or to defend the State in time of war. Otherwise the State shall not contract any debt except the same shall be authorized by law, and provision must be made for the payment of the annual interest on the same and also for the payment of the principal within 20 years. All such propositions must first receive the approval of the voters.

As regards counties, cities, towns, school districts or other municipal corporations, no debt is to be incurred by them in an amount exceeding 1½% of the taxable property without the assent of 3-5 of the voters therein, nor in cases requiring such assent shall the total indebtedness at any time exceed 5% of the taxable property. It is further provided that "any city or town," with the required assent of the voters, may be allowed to become indebted to a larger amount but not exceeding 5% additional for supplying such city or town with water, light and sewers, when the works for the same shall be owned and controlled by the municipality. The provisions in full will be found in Section 6 of Article 8 of the Constitution.

POPULATION OF STATE—

1910 1,141,990	1890.....357,232	1870.....23,955
1900 518,103	1880..... 75,116	1860.....11,594

CITIES, COUNTIES AND TOWNS IN THE STATE OF WASHINGTON

Equitable Trust Company of New York City is the fiscal agent for the State of Washington.

ABERDEEN.
This city is in Chehalis County. Incorporated, May 12, 1890. Commission government rejected Nov. 20, 1911.
Funding Bonds.
5½s '11 J-D $120,000c.....June 1 '22-'31
Refunding Bonds.
5½s J-D $40,000.....June 1 '22-'31
GEN. BD. DEBT Oct 8 '14.....$ 160,000
Warrant debt..... 145,498
Cash on hand..... 11,557
Assessed valuation '14 (2-5 act.).... 7,552,017
Total tax rate (per $1,000) '13.... 47.81+
Population in 1910.....13,660
INTEREST at Equitable Trust Co., N. Y.

BELLINGHAM.
This city is in the county seat of Whatcom County and was organized Dec. 28, 1903, by the union of the cities of Fairhaven and Whatcom.
Bonds Issued by Bellingham to Refund Bands of Former Cities. New Whatcom—
Series A—Funding Bonds.
5s g A-O $18,000c.....Oct 1 1926
Series B—Funding Bonds.
5s g A-O $39,000c.....Oct 1 1926
Series C—Funding Bonds.
5s g A-O $237,000c.....Oct 1 1926
Series D—Funding Bonds.
5s g A-O $183,000c.....Oct 1 1926
Series E—Funding Bonds.
5s g A-O $225,000c.....Oct 1 1926
BONDED DEBT Sept 1 '14.....$ 702,000
Cash in treasury..... 97,722
Assessed Valuation for 1913.

District A (former old Whatcom)..	2,110,978
District B (former new Whatcom)..	6,515,075
District C (former Keeslingville)..	431,097
District D (former Fairhaven)....	1,490,339
District E (former Silver Beach)..	101,256
District F (water-front).....	533,022
Total for all Bellingham.....$11,181,767	

City Tax Rate (per $1,000), 1913.

District A	$12.75
District B	12.55
District C	10.50
District D	18.30
District E	9.00
District F	9.00

Population in 1910.....24,298
INTEREST at Equitable Trust Co., N. Y.

BELLINGHAM SCH. DIS NO. 301.
This district was formed by the consolidation of Whatcom County School Districts Nos. 1, 4, 37 and 81.
Building Bonds (Red. aft. June 1, 1918.)
4½s '08 June $70,000.....June 1 1928
Refunding Bonds.
5s '13 ann $35,000.....
Old District No. 1 (Whatcom).
4½s '01 J-J $13,000.....Jan 2 1921
4½s '03 M-S 65,000.....Mch 10 1923
Old District No. 4 (Fairhaven).
3¾s '03 June $25,000.....June 15 1923
BONDED DEBT Oct 16 '14.....$ 208,000
Assessed valuation '14 (2-5 act.).... 12,222,495
School tax (per $1,000) '14..... 9.75
INTEREST on building and 3¾% bonds payable at State Treasurer's office in Olympia; on refunding bonds at Bellingham National Bank; on 4½s and bonds of 1901 at Equitable Trust Co., New York City.

BENTON COUNTY S. D. No. 16.
Building (Redeemable beg. in 1922).
5s '12 Sept $50,000.....Sept 1 1932
TOTAL BONDED DT. July 1 '13.$ 96,000
Assessed valuation 1,897,097
Actual valuation 4,000,000
INTEREST at County Treasurer's office in Prosser.

CENTRALIA.
This city is in Lewis County. Incorporated in 1890.
Electric-Light Bonds.
6s .... $11,000.....Mar 1 1915
Trunk Sewer Bonds.
6s .... $22,150.....Oct 22 1917
*Water Revenue Bonds.
6s g '13 semi-ann. $300,000.....1919-1938
Funding Bonds.
5s '14 M-N $118,891.01.....May 1934
GEN. BD. DEBT Sept 20 '14.....$ 152,041
Water bonds *300,000
Assessment debt (add'l)..... 135,000
Warrant debt 88,000
Assessed val., '13..... 2,405,783
Real value (estimated)..... 5,000,000
Total tax rate (per $1,000) '14.... 54.00
Population in 1910..... 7,311
INT. on electric-light, water and funding bonds at fiscal agency (Equitable Tr. Co.) in N. Y. City; other bonds at Centralia.
*The water bonds are not a direct obligation of the city, but against the water system and its income. The total issue of $300,000 is being delivered in installments from time to time to take up the monthly estimates of work done on the system.

CHEHALIS.
This city is in Lewis Co. Incorporated Sept. 22, 1890. State Supreme Court upholds city's right to issue bonds for gravity-water system.
6s J-J $23,000.....Jan 1 1915
Gen. bonded debt Dec 31 '13.....$ 23,000
Impt. bonded debt (add'l)..... 146,926
Impt. warrant debt (add'l)..... 16,975
Warrant debt (add'l)..... 74,575
Assessed valuation 1913..... 1,517,000
Real value (est.) 3,000,000
Population in 1910.....4,507

CHEHALIS COUNTY.
Montesano is the county seat.
Funding Bonds.
5½s '13 J-D $180,000.....Dec 1 1924
(Red. $18,000 yearly beg. Dec. 1, '14.)
BOND DEBT Sept '14.....$ 180,000
Assessed valuation '13..... 34,305,328
Population in 1910..... 35,590
INT. at fiscal agency N. Y.

CHEHALIS CO. S. D. No. 5.
Building Bonds.
5s '02 J-J $8,000.....July 31 1922
(Subject to call after July 31, 1903.)
4s '06 Aug $20,000.....May 1 1926
(Subject to call after May 1, 1907.)
4s '09 Sept $80,000.....Sept 1 1929
(Subject to call after Sept. 1, 1910.)
Warrant Funding Bonds.
4s '05 Aug $11,000.....Feb 25 1925
(Subject to call after Feb. 25, 1906.)
4s '09 July $70,000.....July 1 1929
5½s '14 M-S 86,000.....Mar 1 '20-'34
BONDED DEBT Oct '14.....$ 275,000
Assessed valuation '13..... 7,480,223
School tax rate (per $1,000) '13... 11.30
INTEREST at State Treasurer's office in Olympia.

CHEHALIS CO. SCH. DIS. No. 28.
Building Bonds.
4¾s '07 $40,000.....Aug 1 1927
Warrant Funding Bonds.
5s '11 F-A $60,000.....Feb 15 1931
(Subject to call after Feb. 15, 1912.)
4½s '13 s-a $90,000.....1933
(Subject to call beginning 1915.)
BONDED DEBT Oct '14.....$ 190,000
Assessed valuation '13 (3-5 act.)... 4,485,586
School tax rate (per $1,000) '13.... 10.45
INTEREST at State Treasurer's office in Olympia.

CHELAN CO. SCH. DIST. No. 46.
Building Bonds (*Tax-Exempt*).
4s '06 June $12,000c.....June 23 1926
(Subject to call June 23, 1907.)
4¾s '07 J-J $10,000c.....July 1 1927
(Subject to call July 1, 1922.)
4s '09 Feb $80,000c.....Feb 15 1929
(Subject to call Feb. 15, 1910.)
5½s '10 Dec $15,000c.....Dec 1 1930
(Subject to call Dec. 1, 1911.)
5s '11 July $50,000.....July 1 1911
(Subject to call.)

(Compiled by the Commercial and Financial Chronicle.)

CHELATIS CO. SCH. DIST. No. 28—Continued.
BONDED DEBT Oct 1 '13.....$ 167,000
Floating debt 33,452
Sinking fund 8,190
Assessed valuation '13 (2-5 act.).... 5,125,335
School tax rate (per $1,000) '13.... 14.00
Population in 1913..... 5,000
INTEREST at County Treasurer's office.

CHELAN COUNTY S. D. No. 49.
Building Bonds (*Tax-Exempt*).
5½s '07 Apr $18,000c.....Apr 15 1922
(Subject to call beg. April 15, 1908.)
5s '11 Nov $35,000c.....Nov 1 1926
(Subject to call beg. Nov. 1, 1912.)
BONDED DEBT Oct 1 '13.....$ 53,000
Floating debt 6,268
Sinking fund 5,560
Assessed valuation '13 (2-5 act.)... 1,306,591
School tax rate (per $1,000) '13.... 15.00
Population in 1913..... 4,000
INTEREST at County Treasurer's office.

CHELAN CO. SCH. DIST. No. 56.
Building Bonds (*Tax-Exempt*).
5s '07 Aug $14,500c.....Aug 1 1927
(Subject to call beg. Aug. 1, 1908.)
5s '11 July $35,000c.....July 1 1931
(Subject to call beg. July 1, 1912.)
BONDED DEBT Oct 1 '13.....$ 49,500
Floating debt 999
Sinking fund 1,711
Assessed valuation '13 (2-5 act.)... 1,645,068
School tax rate (per $1,000) '13 .. 11.25
Population in 1913..... 2,000
INTEREST at County Treasurer's office.

CLALLAM COUNTY.
County seat is Port Angeles. All bonds are tax-exempt.
Refunding Bonds.
4½s M-N $90,000c.....May 15 1921
Road and Bridge Bonds.
5s '13 F-A $300,000c.....Aug 1 1933
(Subject to call Aug. 1, 1914.)
BONDED DEBT Sept 1 '14.....$ 390,000
Warrant debt (additional)..... 44,648
TOTAL DEBT Sept 1 '14..... 434,648
Sinking fund 4,684
Assessed valuation '13 (½ act.).. 12,440,420
State and Co. tax (per $1,000) '13 23.00
Population in 1910..... 6,755
INTEREST at Equitable Trust Co., New York.

CLALLAM COUNTY SCH. DISTS.
School District No. 3 Bonds.
5½s J-D $4,000c.....Dec 1 1929
(Subject to call after 1919.)
5s Nov $6,000c.....Nov 1 1931
(Subject to call after 1912.)
School District No. 301 Bonds.
5½s Aug $4,000c.....Aug 1 1932
(Subject to call beg. 1913.)
School District No. 5 Bonds.
6s J-J $2,000.....Jan 1 1924
(Subject to call Jan. 1, 1914.)
School District No. 7 Bonds.
6s '98 F-A $21,000c.....Feb 1 1918
5s '12 J-J 51,200.....July 1 1922
(Subject to call after July 1, 1917.)
School District No. 27 Bonds.
4½s s-an $2,000.....Jan 1 1922
(Subject to call June 12, 1912.)
TOTAL BOND. DT. Sept 23 '14...$ 90,200
Assessed val.,' 13 { Dist. No. 5.... 88,898 / Dist. No. 7.... 1,501,478 / Dist. No. 28.... 617,249
Sch. tax rate '13 { Dist. No. 5.... 4.00 / Dist. No. 7.... 10.00 / Dist. No. 27.... 2.00
Population in 1912 (est.).....3,500
INTEREST on 6% bonds payable at Equitable Trust Co., New York.

CLARKE COUNTY.
County seat is Vancouver. Bonds are tax-exempt. Population 1910, 26,115.
Funding Bonds.
6s g J-D $61,000c.....Dec 1 1916
4s J-J 40,000c.....July 2 1921
BONDED DEBT Sept '14.....$ 101,000
Assessed valuation '14 (45% act.) 15,167,342
State and Co. tax (per $1,000) '13 29.00
INTEREST at Equitable Trust Co., New York.

CLARKE CO. SCH. DIST. No. 6.
4½s ....$ 25,000.....July 1 1929
5½s .... 11,475.....Apr 1 1931
5½s .... 5,000.....Sept 1 1933
5s .... 20,000.....Sept 1 1931
4½s '12 .... 100,000.....Feb 3 1932
BONDED DEBT April 20 '14.....$ 165,475
Assessed valuation '13..... 5,139,224
INTEREST payable at County Treas. office.

CLARKE CO. SCH. DIST. No. 58.
Building Bonds.
5s '13 Nov $29,000.....1933
TOTAL DEBT Sept 19 '14.....$ 29,000
Assessed valuation '13..... 687,203
INTEREST payable at County Treas. office.

COWLITZ COUNTY.
Kalama is the county seat.
Funding Bonds (Series "C").
5s '11 F-A $22,000c.....Aug 1 1931
(Subject to call Feb 1, 1927.)
'11 M-N $50,000c.....May 15 1931
(Subject to call after May 15, 1926.)
'11 J-J $14,000c.....July 1 1931
(Subject to call after Jan. 1, 1927.)
TOTAL DEBT April 1 '14.....$ 97,021
Assessed valuation '13..... 9,267,086
Population in 1910..... 12,561
INTEREST payable at Equitable Trust Co., New York; Harris Trust & Sav. Bank, Chicago; Harris, Forbes & Co., New York City, and at N. W. Harris & Co., Inc., Boston.

ELLENSBURG.
This city is in Kittitas County.
Electric-Light Bonds.
5s J-D $44,000c.....June 1 1931
Sewer Bonds.
5s J-D $26,000c.....June 1 1931
*Electric-Light and Power Bonds.
6s M-S $110,000c.....Mar 1 1927
*Water Bonds.
6s A-O $99,748.35c.....Oct 1 1934
Refunding Bonds.
5s J-D $29,000c.....Dec 1 1931
Funding Bonds.
5s .... $20,000.....Feb 1 1934
6s .... †18,000.....May 10 1920
GEN. BONDED DT. Sept 19 '14.$ 119,000
Light and water debt (add'l)..... *209,748
Floating debt.... { Current expenses 15,467 / Electric light... 90,811 / Water 15,007
Assessed valuation '14 (½ act.)... 2,284,585
Total tax (per $1,000) '13..... 49.94
Population in 1910..... 4,209
*The electric light and power and water bonds are not a direct obligation of the city, but against the electric light and water systems and their incomes.
†This $18,000 issue was never approved by the voters, so the city has always considered it as floating indebtedness, but the same is not included in such indebtedness given above.

ELLENSBURG SCH. DIST. No. 3.
Refunding Bonds.
5s A-O $40,000c.....Oct 1 1931
High-School Bonds.
4½s Dec $90,000c.....Dec 1 1932
BONDED DEBT March '14.....$ 130,000
Assessed valuation '14..... 3,236,869
(Assessment about 40 to 50% actual value.)
Population in 1913 (est.).....5,500
INTEREST at County Treas. office.

EVERETT.
This city is in Snohomish County. Incorporated May 4, 1893.
Sewer Bonds.
5s g F-A $60,000c.....Feb 1 1920
Funding Bonds.
6s J-D $61,900c.....Dec 1 1915
Warrant Funding Bonds.
5s g '11 J-J $613,000c.....July 15 1931
GEN. BOND. DT. Jan 1 '14.....$ 764,900
Assessment debt (add'l)..... 731,842
Floating debt 55,198
TOTAL DEBT Jan 1 '14..... 1,551,940
Sinking fund 80,339
Assessed valuation '13 (2-5 act.).. 13,457,336
Total tax rate (per $1,000) '14... 43.50
Population in 1910..... 24,814
INTEREST at Equitable Trust Co., New York.

EVERETT SCH. DIST. No. 24.
3¾s '07 .... $150,000c.....Mch 1 1927
3¾s '07 .... 50,000c.....May 1 1927
3¾s '07 .... 50,000c.....July 1 1927
4½s '08 .... 50,000c.....Oct 1 1928
4½s '09 .... 25,000c.....Jan 1 1929
4½s '09 .... 25,000c.....Apr 1 1929
4½s '09 .... 50,000c.....June 1 1929
BONDED DEBT Jan 1 '13.....$ 400,000
Floating debt Oct 21 '12..... 111,550
Sinking fund and cash Oct 21 '12 19,180
Assessed valuation '12 (3-5 act.).. 13,586,246
School tax rate (per $1,000) '11..... 12.80
INTEREST at County Treas. office.
OPTIONAL.—All the above bonds are subject to call after 1 year from issue.

FRANKLIN COUNTY.
Pasco is the county seat.
Fund. Bonds (*Red. beg. Dec.* 1, 1921.)
5s '11 .... $40,000.....Dec 1 1931
Court-House and Jail Bonds.
5s '12 A-O $85,000.....Apr 1 1932
BONDED DEBT May 1 '14.....$ 135,000
Assessed valuation '13..... 8,670,008
Population in 1910..... 5,153

FRANKLIN CO. SCH. DIS. No. 1.
5s '11 .... $40,000.....1931
(Subject to call after 1921.)
BONDED DEBT April '14.....$80,000

HOQUIAM.
This place is in Chehalis County. Commission government adopted June 5, 1911.
Refunding Bonds.
5½s J-D $115,000.....1922-1931
GEN. BONDED DT. March '14...$ 115,000
Local impt. bonds (add'l)..... 239,565
Warrants outstanding 157,115
Cash on hand..... 63,305
Assessed valuation '13..... 3,973,699
Tax rate (per $1,000) '13..... 17.10
Population 1910 8,171
INTEREST at Harris Tr. & Sav. Bk., Chicago.

JEFFERSON COUNTY.
County seat is Port Townsend.
Refunding (*Part every* 5 *years*).
5½s g '11 J-J $133,000c.....Jan 1 '16-'31
BONDED DEBT April '14.....$ 133,000
Floating debt 91,000
Sinking fund 16,000
Assessed valuation '13 (2-5 act.).... 6,839,800
State and county tax (per $1,000) '13 28.24
Population in 1910..... 8,337
INTEREST at Equitable Trust Co., New York.

JEFFERSON CO. S. D. No. 1.
Treasurer; on 5s at State Treasurer's office.
Fund. Bonds (*Red. beg. in* 1905).
6s '95 M-N $24,000.....Nov 1 1915
Refunding Bonds.
5s '11 A-O $82,000.....Apr 1 1931
BONDED DEBT April '14.....$ 103,000
Assessed valuation '13 (2-5 act.)... 1,508,342
School tax rate (per $1,000) '13... 10.00
INTEREST on 6s at office of County Treasurer; on 5s at State Treas. office.

KING COUNTY.
County seat is Seattle. The State Supreme Court on Dec. 6, 1913, declared valid the court-house bonds given below. The road bonds given below are part of an issue of $3,000,000, the legality of which has been upheld by State Supreme Court.
5s '08 M-S $1,500,000c.....Mar 1 1928
Court-House Bonds.
5s '13 May $950,000c.....May 1 1933
(Opt. beg. May 1, 1923, $95,000 yearly.)
Refunding Bonds.
4½s '11 F-A $170,000c.....Feb 1 '15-'31
4½s '11 F-A 98,000c.....Feb 1 '15-'31
Harbor Bonds.
4½s g '11 Nov $1,750,000c.....Nov 1 '31
(Subject to call $175,000 yearly Nov. 1, 1921, to 1930.)
Road Bonds.
5s '13 M-S $300,000c.....Sept 1 1933
5s '14 M-N 500,000c.....May 1 1934
BONDED DEBT Sept 23 '14....$ 5,268,000
Assessed valuation '13 (½ act.).. 264,287,057
State and Co. tax (per $1,000) '13 18.01
Population in 1910..... 284,638
Population in 1914 (est.)..... 350,000
INTEREST on 5s payable at Equitable Trust Co., New York; on refunding bonds at Harris Trust & Savings Bank, Chicago; on bonds of 1911 and 1913 at Equitable Trust Co. or at County Treasurer's office.

KING COUNTY COMMERCIAL WATERWAY DIST. No. 1.
P. O. Seattle. Bonds are tax-exempt.
7s '13 J-D $500,000.....Dec 1 1923
(Subject to call after Dec. 1, 1918.)
BONDED DEBT Sept 23 '14.....$ 500,000
Assessed valuation '13 (real)..... 10,056,599
Real value (estimated)..... 25,000,000
Population of district (est.)..... 20,000
INTEREST at County Treasurer's office.

KING COUNTY SCH. DIST. No. 7.
Building Bonds.
5s '07 June $ 1,500c.....June 15 1917
5s '09 Sept 2,000c.....Sept 1 1919
5s '11 Feb 65,000c.....Feb 1 1931
(Subject to call after Feb. 1, 1912.)
5½s '14 ann $9,000c.....April 1 1934
BONDED DEBT Sept 23 '14.....$ 77,500
Assessed valuation '13 (½ act.)... 2,026,949
School tax rate (per $1,000) '13... 10.00
Population in 1914 (est.)..... 3,750
INTEREST on 5s due 1917 payable in New York at Equitable Trust Co.; other bonds at State Treasurer's office.

KING COUNTY S. D. No. 51.
Building Bonds (*Red. beg. in* 1918).
5s '13 Sept $45,000c.....Sept 15 1933
BONDED DEBT Sept 23 '14.....$ 45,000
Assessed valuation '13..... 1,595,103
(Assessment about ½ actual value.)
School tax (per $1,000) '13.....$7.00
Population in 1913 (est.).....2,500
INTEREST at office of State Treasurer, Olympia.

KING CO. SCH. DIST. No. 162.
Building (*Subject to call*).
4½s '10 Aug $55,000c.....Aug 1 1925
4s '05 May 12,000c.....May 15 1920
BONDED DEBT Sept 23 '14.....$ 67,000
Floating debt 8,193
Sinking fund 1,286
Assessed valuation '13 (½ act.)... 2,185,464
School tax rate (per $1,000) '13... 12.00
Population in 1914 (est.)..... 3,200
INTEREST payable at State Treas. office.

KING CO. SCH. DIST. No. 170.
Building (*Subject to call*).
4½s '10 July $46,000c.....July 1 1920
BONDED DEBT Sept 23 '14.....$ 46,000
Assessed valuation '13 (½ act.)... 1,564,469
School tax rate (per $1,000) '13... 11.00
Population in 1914 (est.)..... 2,600
INTEREST payable at State Treas. office.

KITTITAS COUNTY.
County seat is Ellensburg. Chelan County's portion of the bonded debt is $16,513.
County Bonds, 1895.
6s M-N $117,000c.....Nov 1 1915
School No. 22 (*Subject to call*).
5s '13 ann $11,000c.....Sept 1 1933
School No. 25 (*Subject to call*).
4½s '11 ann $8,000c.....Oct 2 1919
School No. 200 (*Subject to call*).
5½s '12 ann $10,000c.....Dec 1 1932
CO. BONDED DT. Sept 21 '14..$ 117,000
Cash in county funds..... 17,179
Chelan County's portion..... 16,513
Assessed valuation '13 (2-5 act.). 16,669,448
State and Co. tax (per $1,000) '13. 21.04
Population 1910 18,561
INTEREST at Equitable Trust Co., New York.

LEWIS COUNTY.
County seat is Chehalis.
Refund. (*Red. aft.* 10 *years fr. issue*).
4½s '05 J-J $10,000c.....Jan 1 1925
4½s '06 J-J 10,000c.....Jan 1 1925
Funding Bonds.
5s '12 M-S $300,000 .....Mar 1 '23-'32
BONDED DEBT Jan 1 '14.....$ 330,000
Floating debt 75,524
Sinking fund 38,815
Assessed valuation '13 (60% act.). 20,177,489
County tax rate (per $1,000) '13.. 14.59
Population in 1910..... 32,127
INTEREST at office of County Treasurer.

LEWIS CO. SCH. DIST. No. 9.
5s '96 M-S $ 2,600.....Mar 15 1916
5s '06 J-J 15,000.....
(Subject to call $3,000 each year beginning 1918.)

(Compiled by the Commercial and Financial Chronicle.)

LEWIS CO. SCH. DIST.—Concluded.
Refunding (*Red. beg. in* 1912).
4½s '11 June $50,000c.....June 5 1931
Building (*Red. beg. in* 1912).
4½s '11 July $43,000c.....July 1 1931
BONDED DEBT Jan 1 '14.....$ 112,600
Floating debt 82,470
Sinking fund Jan 1 '14..... 2,939
Assessed valuation '13 (60% act.).. 3,011,065
School tax rate (per $1,000) '13... 15.00
INTEREST at State Treasurer's office.

LEWIS COUNTY S. D. No. 211.
Building (*Red. begin. July* 1, 1914).
5½s '13 July $25,000.....July 1 1918
BONDED DEBT Jan 1 '14.....$ 25,000
Floating debt 5,995
Sinking fund 697
Assessed valuation '13 (60% act.).. 807,863
School tax (per $1,000) '13..... 12.00

LINCOLN COUNTY.
Davenport is the county seat. All bonds are taxable.
Refunding Bonds.
4½s '02 June $54,000c.....June 2 1922
Court-House (*Red. beg. in* 1916).
4½s '06 Apr 5 $41,000c.....Apr 5 1926
BONDED DEBT March 20 '14..$ 95,000
Assessed valuation '13 (½ act.).. 24,177,168
State and Co. tax (per $1,000) '13. 16.80
Population in 1910..... 17,539
INTEREST at Equitable Trust Co., N. Y.

MIDDLE KITTITAS IRRIG. DIST.
A district in Kittitas County.
6s g '10 J-J $103,000c.....1940
BONDED DEBT Sept 21 '14.....$103,000
Assessed valuation '13 (40% act.).. 673,274
Tax rate (per $1,000) '13..... 9.40
INTEREST at County Treasurer's office.

NORTH YAKIMA.
This city is situated in Yakima County. Incorporated May 14, 1894. Commission government went into effect September, 1911.
Sewer Bonds.
4s '06 M-S $48,000c.....Mar 1 1926
4½s '11 A-O 50,000c.....Oct 1 1931
5s g '11 J-D 60,000c.....Dec 15 1931
(Subject to call after Dec. 15, 1912.)
Refunding Bonds.
4½s '08 J-D $80,000c.....Dec 1 1928
5s '10 J-D 30,000c.....Dec 1 1930
5s '12 F-A 30,000c.....Feb 1 1932
(Subject to call after Feb. 1, 1913.)
TOTAL DEBT March 18 '14.....$ 298,000
Assessed valuation '13 (3-5 act.).... 8,450,645
City tax (per $1,000) '13..... 20.94
Total tax rate (per $1,000) '13.... 43.86
Population in 1910 (Census)..... 14,082
INTEREST on sewer 4½s and refunding 5s of 1910 at fiscal agency (Equitable Trust Co.), New York; the sewer 4s at Chicago; sewer 5s and refunding 4½s at City Treasurer's office; others at State Treasurer's office.

NORTH YAKIMA S. D. No. 7.
4½s '00 May $11,000c.....May 1 1920
4s '03 Aug 22,000c.....Aug 8 1923
(Subject to call after Aug. 1, 1904.)
4s '05 Feb $25,000c.....Feb 11 1925
(Subject to call after Sept. 11, 1906.)
4s '07 Apr $150,000c.....April 1927
(Subject to call after 1908.)
5s '11 Feb $75,000c.....Feb 1931
(Subject to call after 1912.)
BONDED DEBT Sept 19 '14.....$ 303,000
Sinking fund 13,780
Assessed valuation '13 (45% act.).. 9,766,600
School tax (per $1,000) '13..... 6.22
INTEREST at New York, Chicago and in Olympia, Wash.

OLYMPIA.
Olympia is situated in Thurston County. Incorporated as a town 1859; as a city 1881. Bonds below all owned by State Permanent School Fund.
Refunding Bonds (*Red. beg. in* 1911).
3¼s '06 J-J $200,000c.....1926
BONDED DEBT Sept 24 '14.....$ 200,000
Assessment debt (est.)..... 357,463
Floating debt (est.)..... 65,886
Assessed valuation '14 (3-5 act.).... 3,271,435
Total tax (per $1,000) '13..... 48.00
Population in 1910..... 6,996
INTEREST at office of State Treasurer.

OLYMPIA SCHOOL DIST. No. 1.
Refunding Bonds.
5s '10 J-J $25,000c.....July 1 1930
(Subject to call beg. July 1 1912.)
5½s '13 Oct $10,000c.....Oct 15 1933
(Subject to call beg. Oct. 15, 1914.)
Funding Bonds (Red. beg. in 1912).
4½s '11 s-an $78,000.....Jan 2 1932
BONDED DEBT Sept 18 '14.....$ 113,000
Floating debt 6,237
Assessed valuation '13 (3-5 act.).... 3,432,107
School tax rate (per $1,000) '13... 13.00
Population in 1914 (est.)..... 9,000
INTEREST at State Treasurer's office.

PACIFIC COUNTY.
South Bend is the county seat.
Building Bonds (*Red. any time*).
5s '13 .... $10,000.....1933
Court-House (*Red. beg. in* 1911).
5s '10 J-J $150,000.....July 1 1920
Refunding (*Red. beg. in* 1911).
5s '01 M-N $33,000.....Nov 2 1921
Road and Bridge (*Red. beg.* in 1912).
5s '11 J-J $100,000.....Jan 2 1926
BONDED DEBT April 26 '14...$ 283,000
Warrants outstanding 200,000
Assessed valuation '13..... 17,979,788
State and Co. tax (per $1,000) '12 12.65
Population in 1910..... 12,532

PACIFIC COUNTY S. D. No. 36.
High-School-Building Bonds.
4½g '13 ann $75,000 (Red. beg. '23)....1933
BONDED DEBT Sept '13.....$ 105,000
Assessed valuation 2,219,919

PEND OREILLE COUNTY.
Newport is the county seat.
Warrant-Funding Bonds.
4½ g '12 M-N $72,000c.....May 1 1932
(Subject to call after May 1, 1922.)
BONDED DEBT May '14.....$ 72,000
Warrants outstanding 56,152
Sinking fund 10,000
Assessed valuation '14 (½act.)... 6,550,382
Population in 1910.....6,660

PIERCE COUNTY.
The county seat is Tacoma.
Refunding Bonds.
5s '05 A-O $268,000c.....Oct 2 1925
(Subject to call beginning Oct. 2, 1915.)
3¼s '06 J-D $8,000c.....June 1 1926
(Subject to call beginning June 1, 1907.)
4s '06 M-S $150,000c.....Sept 1 1926
BONDED DEBT Jan 1 '13.....$ 426,000
Assessed valuation, real..... 81,082,429
Assessed valuation, personal..... 17,514,757
Assessed valuation, railroads..... 10,146,457
Total valuation '12 (3-5 act.).....108,743,643
State and Co. tax (per $1,000) '12 13,000
Population in 1910..... 120,812
Interest on 3¼s is payable at State Treasurer's; on other bonds in N. Y. City.

PORT ANGELES.
This city is in Clallam County. Incorporated as a city of the third class about June, 1891.
Refunding Bonds (*Red. Oct.* 1, 1923).
5½s '12 .... $50,000.....Feb 1 1932
6s '13 A-O 36,000.....Oct 1 1933
GEN. BD. DEBT Oct 1 '14.....$ 86,000
Assessment bonds (additional)..... 223,121
Warrants outstanding..... 59,298
Assessed valuation '14..... 2,020,060
Population in 1910.....2,286

PORT OF SEATTLE.
P. O. Seattle.
East Waterway Improvement District No. 1.
4½s g '13 J-J $494,000.....Jan 1 '15-'55
4½s g '13 M-N 348,000.....May 1 '15-'55
5s g '13 M-S 436,000.....Sept 1 '15-'55
East Waterway Improvement No. 2 Bonds.
5s g '13 M-S $554,000.....Sept 1 '15-'55
5s g '14 J-J 40,000.....Jan 1 '15-'56
Salmon Bay Improvement Bonds.
4½s g '13 J-J $347,000.....1915-1955
5s g s-a 197,000.....Part yearly
West Seattle Ferry Bonds.
5s g '14 J-J $200,000.....Jan 1 '15-'55
Central Water Front Improvement Bonds.
4½s g M-N $745,000.....Part yearly
Smith's Cove Improvement Bonds.
4½s g s-a $996,000.....Part yearly
Lake Washington Improvement Bonds.
4½g '13 J-J $149,000.....July 1 '15-'55
BONDED DEBT Sept 1 '14....$ 4,712,000
Assessed valuation '13 (45% act.) 263,611,027
Population in 1910.....284,638
Population in 1913 (estimated).....338,500
INTEREST at Equitable Tr. Co., N. Y.

PORT TOWNSEND.
This city is in Jefferson County. Incorporated Dec. 8, 1881.
Funding Bonds.
6s M-N $29,100c.....Dec 1 1915
*Water Bonds (*Red. any time*).
6s M-N $185,000r.....Nov 1925
Refunding Bonds.
5½s '11 J-J $75,000c.....July 1931
(Subject to call after 1921.)
GEN. DEBT Jan 1 '14.....$ 104,100
Assessment debt (additional)..... 28,983
Sinking fund and cash 11,643
Water bonds (not included above) 180,000
Water sinking fund..... 8,929
Assessed valuation '13..... 1,387,239
City tax (per $1,000) '13..... 17.00
Population 1910 4,181
*These bonds are not a city obligation.

SEATTLE.
Situated in King County. Incorporated as a town Jan. 14, 1865 and as a city Dec. 2, 1869. Proposed new city charter rejected June 30, 1914. An issue of $800,000 municipal-electric-railway system bonds was voted Mar. 7, 1911, and validity subsequently upheld. Up to Aug. 1, 1913, $300,000 had been issued.
Building Bonds.
4s '02 A-O $100,000c.....Oct 15 1922
4s '05 J-J 175,000c.....July 1 1925
4½s '10 J-J 50,000c.....July 1 1930
4½s '10 J-D 300,000c.....Dec 1 1930
Funding Bonds.
5s '11 J-D $46,000c.....June 1 1931
General Improvement Bonds.
4½g '11 J-D $136,000c.....Dec 1 1931
Sewer Bonds.
4½s '07 M-S $1,650,000c.....Mar 1 1927
Refunding Bonds.
5s g '11 J-J $391,000c.....July 1 '15-'31
5s g '12 A-O 699,000c.....Apr 1 '14-'32
5s g '12 J-J 376,000c.....July 1 '14-'32
5s '13 J-J 780,000 .....July 1 '15-'18
Light Plant Extension Bonds.
4s '05 J-J $250,000c.....July 1 1925
4s '09 A-O 500,000c.....Apr 1 1929
4½s '10 M-S 200,000c.....Mch 1 1930
4½g '12 J-J 1,000,000c.....Jan 1 1932
Park Bonds.
4s '07 M-S $500,000c.....Mch 1 1927
4s '09 A-O 500,000c.....Apr 1 1929
4½s '10 M-S 500,000c.....Mch 1 1930
4½s '10 J-D 500,000c.....Dec 1 1930
4½s '11 J-D 1,000,000c.....June 1 1931
4½g '12 J-J 500,000c.....Jan 1 1932
4½s '12 J-J 500,000c.....July 1 1932
Municipal Light Plant Bonds.
3¾s '04 J-J $400,000c.....July 27 1923
3¾s '04 A-O 190,000c.....Apr 1 1924
3¾s '07 J-J 200,000c.....July 1 1927
3¾s '08 J-J 400,000c.....J & J 1 1928
4½s '11 J-D 100,000c.....June 1 1931
4½s '14 .... 75,000 .....Jan 1 1934
Refunding Water and Sewer Bonds.
5s g '10 J-J $814,000c.....July 1 '14-'30
Water-Works-Extension Bonds.
4½s '10 J-J $500,000c.....July 1 1930
4½s '11 J-J 580,000c.....July 1 1931
4½g '12 J-J 500,000c.....Jan 1 1932
Water Tunnel Bonds.
4½s g '14 J-J $300,000.....July 1 1934
Refuse Disposal Plant Bonds.
4½s '10 J-J $320,000c.....July 1 '15-'30
City Electric Ry. Bonds.
4½g '13 M-N $300,000c.....May 1 1933

BALLARD—Annexed Jan. 29, 1907:
Refunding Bonds.
6s '95 J-D $24,500c.....Dec 1 1915
Funding Bonds.
4½s '05 F-A $75,000c.....Aug 1 1925
5s '10 M-S 65,000c.....Mar 1 1930
Water-Works Bonds.
6s '95 J-J *$42,000c.....Jan 1 1915
4½s '02 F-A *10,000c.....Aug 1 1917
4½s '04 A-O *25,000c.....Oct 1 1924

COLUMBIA—Annexed May 3, 1907:
General Municipal Bonds.
6s '04 F-A $3,900c.....Aug 27 1924

In addition to the bonds given above, there are also outstanding $1,767,000 5% (J.-J.) coup. Cedar River water bonds due Jan. 1, 1915-'26. These bonds are a lien on a certain portion of the revennes of the Water Dept., and are not a general municipal indebtedness. There also remain outstanding $510,000 from an issue of $1,250,000 Cedar River water-supply warrants payable at the rate of $100,000, principal and interest yearly from water revenues only.

*Issued in payment for water systems by their respective cities prior to annexation. They were then made part of the water plant of this city, and although they are a general indebtedness, and interest is being paid from the water fund.

INTEREST is payable as follows: Funding bonds of 1891 and funding bonds of 1893 (first and second series) at Seattle or at Harris, Forbes & Co., N. Y. City; funding bonds due 1931 and 1933 at fiscal agency in N. Y. City or at City Treas. office; sewer tunnel bonds of 1893 and sewer bonds of 1893 at City Treasurer's office or at Blair & Co., N. Y. City; library-site bonds at City Treasurer's office or fiscal agency, N. Y. City; Municipal-light and power-plant bonds (series A and B), State Treasurer's office; municipal-light and and power-plant-extension and park bonds due July 1, 1932, at City Treasurer's office, and fiscal agency, New York City; park bonds due 1931, the refuse-disposal-plant bonds and bonds of 1912 at fiscal agency in N. Y. City (Equitable Trust Co.). All the other bonds, except those of the annexed cities, at City Treasurer's office or at fiscal agency in New York. Interest on the annexed cities' bonds is payable as follows: On refunding bonds, the water-works bonds due 1917 and 1924 and on the general municipal bonds, at the fiscal agency in N. Y. City; on the funding bonds at the Harris Trust & Savings Bank, Chicago; on the water-works bonds due 1915 at the Chemical Nat. Bank, N. Y. City, and on the water-works bonds due 1922 at the State Treasurer's office.

TOTAL DEBT, etc.—Cash in treasury Apr. 1, 1914,.....$1,330,721.05

	Apr. 1 '14	Apr. 1 '13
Bonded debt	$15,440,400	$15,258,400
Floating debt	None	None
Total	$15,440,400	$15,258,400
Water debt (inclu.)	2,572,241	2,625,827

In addition to the above debt, the city had outstanding March 1, 1914, $8,762,680.99 of assessment bonds and $2,316,162.53 of assessment warrants, both a lien only against benefited property.

DEBT LIMITATION.—The limitation of bonded indebtedness is 10% of the assessed valuation, of which 5% is for water, light and sewers and 5% for general purposes.

CITY PROPERTY.—Jan. 1, 1914, the city owned personal property, real estate and securities valued at $29,735,473. This total is exclusive of highways, sewers and cash.

ASSESSED VALUATION.—Assessment about 45% actual value.—

	1913	1912
Real estate	$178,468,225	$176,975,528
Personal	36,893,926	35,953,520
Total	$215,362,151	$212,929,048
Tax (per $1,000)..	$43.87	34.57

$CITY TAX RATE (per $1,000) for 1913 in the "old limits" was $19.86; in the "new limits" it was $19.31 and in South Seattle $17.63. The total tax rate for 1913 was $43.87, incl. State, county, city, school and Port of Seattle.

POPULATION in 1910 (Census) was 237,194; in 1900 (Census), 80,671; in 1890, 42,837; in 1880, 3,533.

SEATTLE SCHOOL DISTRICT NO. 1
This school district is in King County, and includes the city of Seattle.
School Bonds.
5s '95 J-J $400,000c.....July 1 1915
4s '02 M-S 275,000c.....Mar 1 1922
4½s '03 A-O 100,000c.....Oct 1 1923
4½s '04 M-N 300,000c.....May 1 1924
4½s '00 M-S 200,000c.....Sept 1 1920
4s '06 J-J 500,000c.....Jan 1 1926
4½s '08 M-N 300,000c.....May 1 1928
4s '08 M-N 200,000c.....May 1 1928

SEATTLE—Concluded.

4s 09 M-N 400,000c.....May 1 1929
4½s '11 M-S 400,000c.....Mch 1 '15-'30
4½s '12 M-S 510,000c.....Mch 1 '15-'31
4½s '11 M-S 100,000c.....Mch 1 1931
4½s '13 M-S 200,000c.....Mar 1 '15-'33
5s '13 M-S 437,000c.....Mar 1 '15-'33
5s '14 A-O 361,000c.....1916-1934
4½s '14 A-O 152,000c.....

So. Park District No. 9 (Annexed).
5s '01 M-S $3,000c.....Sept 1921

Rainier Val. District No. 18 (Annexed).
4s '03 July $15,000c.....July 1923

W. Seattle District No. 73 (Annexed).
4½s '08 J-D $55,000c.....June 1928

Bullard District No. 50 (Annexed).
4¾s '03 F-A $20,000c.....Feb 1 1923
4½s '99 M-S 10,000c.....Sept 1 1919
4¼s '01 M-S 8,000c.....Sept 20 1921
3¾s '07 F-A 70,000c.....Mar 1 1927

Georgetown Dists. 143 and 153 (Annexed).
4¾s '04 J-D $20,000c.....June 4 1924
4½s '09 M-S 20,000c.....Mar 1 1929

BONDED DEBT June 30 '14...$ 4,904,000
Sinking fund 244,334
Assessed valuation '13 (45% act.) 218,046,671
School tax (per $1,000) '13..... 6.00
Value of school property..... 6,315,190
Population in 1910.....237,194

INTEREST on 4½s of 1911 payable in Chicago (Harris Tr. & Sav. Bank) or N. Y. City; on $200,000 4½s of 1913 at State Treasurer's office in Olympia; all other bonds at office of County Treasurer or at State fiscal agency in N. Y. City (Equitable Trust Co.).

SKAGIT COUNTY.

Mt. Vernon is the county seat.

Refunding Bonds (Red. beg. in 1914).
3¾s o4 J-D $100,000.....June 1 1924

Refunding Warrant (Red. beg. in 1921).
4½s '11 A-O $100,000.....Apr 1 1931

BONDED DEBT Sept 21 '14.....$ 200,000
Assessed valuation '13 (31% act.) 14,367,727
State and Co. tax (per $1,000) '13 29.00
Population in 1910.....29,241

INTEREST on 3¾s at State Treasurer's office; on 4½s at N. W. Halsey & Co., Chi.

SNOHOMISH

This city is in Snohomish County. Incorporated in 1890.

Special water bonds payable from water rent collections.....$ 82,500
Coupon water bonds payable from tax levy 15,000
Refunded water bonds payable from tax levy 28,000
BONDED DEBT Oct 19, '14..... 125,000
Assessed valuation '13 (35% act.). 1,177,235
Total tax rate (per $1,000) '13.... 44.60
Population 1910 3,244

INTEREST on 3¾s at Olympia; on 5s at County Treasurer's office or Equitable Trust Co., N. Y.

SNOHOMISH COUNTY.

County seat is Everett.

Refunding (Subject to call).
3¾s .... $53,000.....Aug 1 1925

Funding Bonds (Red. beg. in 1921).
5s '11 .... $100,000.....Jan 2 1931

BONDED DEBT Feb '13.....$ 153,000
Warrant debt Jan 1 '13..... 194,253
Cash on hand Jan 1 '13..... 115,742
Assessed valuation '11 (48% act). 38,737,641
State and Co. tax (per $1,000) '11. 17.50
Population in 1910.....59,209

INTEREST on 3¾s payable at Olympia; on bonds of 1911 at the County Treasurer's office or at Equitable Trust Co., N. Y. City.

SPOKANE.

This city is in Spokane County. Incorporated Nov. 29, 1881. Commission government adopted in Dec., 1910.

Funding Bonds.
5½s F-A $300,000c.....Feb 1 1918

Crematory Bonds (*Tax-Exempt*).
4½s '09 F-A $70,000c.....Feb 1 1929

Bridge Bonds (*Tax-Exempt*).
4½s g '07 J-D $400,000c.....Dec 1 1933
4½s g '09 J-J 500,000c.....July 1 1934
4½g '11 J-J 415,000c.....July 1 1931

Park Bonds.
5s J-D $100,000c.....Dec 1 1927
4½g '12 J-J 875,000c.....Jan 1 1962

Water Bonds.
4s g '05 J-J $450,000c.....July 1 1925
4½s g '10 J-J 400,000c.....Jan 1 1935

Refunding Water Bonds.
4½g '11 A-O $500,000c.....Oct 1 1931

Refunding Municipal Bonds.
4½g '11 A-O $700,000c.....Oct 1 1931

GEN. BONDS Mar 31 '14.....$ 3,360,000
Water debt (additional)..... 1,400,000
Assessment debt (additional)..... 4,458,602
Floating debt 414,036
TOTAL DEBT Mar 31 '14..... 9,632,638
Sinking fund 141,227
NET DEBT Mar 31 '14..... 9,491,411
Assessed valuation '13 (3-5 act.).. 89,987,215
City tax rate (per $1,000) '13..... 12.00
Total tax (per $1,000) '13..... 33.50
Population in 1910 (Census).....104,237

In addition to the bonds given above there are outstanding $1,185,000 5% (J. & D.) coupon water bonds due Dec. 1, 1914-31 and $78,000 6% (J. & J.) water-works warrants. These are not payable from the general tax levy but are secured by a lien upon the gross revenues of the water-works.

Assessment bonds are not considered city debt, being payable by special assessment.

CITY PROPERTY.—The city inventory on Jan. 1, 1914, showed real estate, buildings, library department equipments, etc., to the value of $9,447,880, including water system valued at $4,802,994.

INTEREST and principal of city bonds payable in New York City at Equitable Trust Co.

SPOKANE SCHOOL DISTRICT NO. 81.

Building Bonds.
5s '98 J-J $ 50,000c.....Jan 1 1918
4s '02 F-A 80,000c.....Aug 1 '15-'22
4½s '04 M-S 209,000c.....Mch 1 1924
4½s '07 J-J 200,000c.....July 1 1927
(Subject to call after July 1 1917.)
4½s '08 J-J $250,000c.....July 1 1928
4½s '09 J-J 400,000c.....July 1 1929
5s '06 M-N 10,500c.....Nov 1 1926
(Subject to call after Nov 1 1916.)
6s '04 F-A $3,000c.....Aug 1 1919
(Subject to call after Aug 1 1914.)
5½s '04 .... $4,000c.....Aug 1 1924
(Subject to call after Aug 1 1914.)
4½s '11 M-N $500,000c.....May 1 1931
4½s '12 J-J 250,000c.....July 1 1932

Refunding Bonds.
4½s '10 J-J $250,000c.....July 1 1930

BONDED DEBT Sept 1 '14.....$ 2,197,500
Floating debt 227,512
Assessed valuation '13 (½ act.)... 90,192,565
School tax (per $1,000) '13..... 5.50
Population in 1913 (estimated).....110,000

INTEREST on bonds due Aug. 1, 1924, payable at County Treasurer's office; on 4½s due March 1, 1924 at County treasurer's office or at State fiscal agency in New York City (Equitable Trust Co.) and on bonds of 1907 and 1912 in N. Y. City at Equitable Trust Co.

SPOKANE SCHOOL DISTRICT NO. 122.

School-Building Bonds. (*Tax-Exempt*).
5s '07 J-D $25,000c.....June 1 1922
(Subject to call after June 1, 1917.)
5s '12 A-O $20,000c.....Apr 1 1932

BONDED DEBT Sept 1 '14.....$ 45,000
Floating debt 5,656
Sinking fund 2,753
Assessed valuation '13 (⅓ act.).... 1,772,862
School tax (per $1,000) '13..... 38.00
Population in 1913 (estimated).....5,000

INTEREST on 5s at fiscal agency in N. Y. City (Equitable Trust Co.).

SPOKANE COUNTY.

County seat is Spokane.

Refunding Bonds (Red. beg. in '11).
4s '01 J-D $129,000c.....Dec 2 1921

Court House and Jail Bonds.
4½s '03 A-O $270,000c.....Oct 1 1923
(Subject to call after Oct 1 1913.)

BONDED DEBT Sept 19 '14...$ 399,000
Warrants outstanding..... 34,499
Cash on hand..... 196,300
Assessed valuation '13 (about 42% actual) 122,492,478
State and Co. tax (per $1,000) '13 16.00
Population in 1910.....139,404

INTEREST at fiscal agency in New York.

(Compiled by the Commercial and Financial Chronicle.)

Attention is called to the announcement on page 11

STEVENS COUNTY.

County seat is Colville. A portion of this county has been taken to form the new Ferry County.

Refunding Bonds.
4½s '02 J-J $35,000c.....Mar 1 1922
Refunding Bonds.
4½s '02 M-N $184,000c.....Nov 1 1929
(Subject to call after Nov 1 1919.)
BONDED DEBT Sept 19 '14....$ 239,000
Assessed valuation '14..... 8,910,941
State and Co. tax (per $1,000) '14 28.00
Population in 1910 19,270
INTEREST payable in N. Y. City.

TACOMA.

Tacoma is the county seat of Pierce County. Incorporated Nov. 8, 1883.

Bridge Bonds.
4½s '09 J-D $300,000c.....July 1 1929
4½s '12 J-J 543,000c.....Jan 1 1932
4½s '13 M-S 35,000c.....Mar 15 1928
Refunding Bridge Bonds.
5s '13 s-an $90,000c.....June 1 '15-'17
Funding Bonds.
5s g '00 F-A $1,093,000c.....Feb 15 1920
Refunding Bonds.
4½s '11 A-O $518,000c.....Apr 1 1931
Surface Water Drainage Bonds.
4½s '09 J-J $ 75,000c.....July 1 1929
4½g '10 F-A 100,000c.....Aug 1 1930
Green River Gravity Water Bonds.
4½s '10 J-J $500,000c.....July 1 1930
Refunding Light Bonds.
5s '13 s-an $250,000c.....June 1 '18-'21
Refunding Water Bonds.
5s '13 s-a $1,750,000c.....June 1 '22-'33
Light and Power-Plant Bonds.
4½s '09 J-J $300,000c.....Jan 1 1929
Wharf and Dock Bonds.
4½g '11 J-J $405,000c.....Jan 1 1931
Road Bonds.
4½s '13 M-S $117,000c.....
(Due $8,000 yearly for 15 years and $5,000 in 16 years.)
GEN. BD. DEBT Sept 1 '14.....$ 6,076,000
Water and light debt (additional. *3,507,904
Improvement debt (additional).... 1,617,913
TOTAL DEBT Sept 1 '14..... 11,201,817
Sinking fund assets..... 300,319
NET DEBT Sept 1 '14..... 10,901,498
Assessed valuation, real..... 48,396,653
Assessed valuation, personal and public service corporation..... 25,892,923
Total valuation '13 (3-5 act.).... 73,298,458
Total tax (per $1,000) '13..... 36.20
Population in 1910 83,743
Population in 1914 (estimated).....110,000
*This debt consists of water and light and power plant bonds maturing from 1 to 20 years. These are not payable from the general tax levy, but are paid out of revenue of water and light plants.
INTEREST on local improvement bonds at City Treasurer's office; other interest at Equitable Trust Co., N. Y.

TACOMA SCHOOL DISTRICT NO. 10.

Building Bonds.
4½s '05 M-S $200,000c.....Sept 1 1925
4½s '11 ann *290,000c.....July 1 1931
4½s '12 ann *200,000c.....Dec 31 1932
4½s '13 July *200,000 .....July 1 1933
Refunding Bonds.
4½s '00 F-A $100,000c.....Feb 1 1920
BONDED DEBT Mar 1 '14.....$ 990,000
Sinking fund 33,243
Value school property '13..... 2,644,522
Assessed valuation '13 (½ act.).. 77,892,299
Tax rate (per $1,000) '13..... 5.15
Population in 1913 (estimated).....100,000
*Redeemable beg. 1 year after date.
INTEREST Equitable Trust Co., N. Y.

WALLA WALLA.

This city is in Walla Walla County. Incorporated in 1862.

Water and Sewer Bonds (*Tax-Exempt*).
5s '99 Jan $159,000c.....1926
Refunding Bonds. (*Tax-Exempt*).
4½s g '12 J-J $40,000c.....Jan 1 1932
City-Hall and Fire-Station Bonds.
5s g '08 J-J $100,000c.....Jan 1 1928
Municipal Improvement Bonds.
5s & 6s .... $41,403.54c.....
Water-Works Bonds (*Tax-Exempt*).
4½s '99 M-S $133,000c.....1919
5s g '06 Nov 213,000c.....1936
(Subject to call.)
GEN. BONDS Oct '14.....$ 686,404
Assessment debt (additional)..... 236,797
Floating debt 90,042
Cash on hand..... 22,042
Assessed valuation '14 (40% act.). 9,359,712
Tax rate (per $1,000) '14..... 13.00
Population 1910 19,364
INTEREST in W. W. and N. Y. City.

WALLA WALLA CO. S. D. NO. 1.

All bonds are tax-exempt.
Funding and Building Bonds.
4½s '03 .... $63,000c.....Sept 21 1923
4½s '08 M-S 30,000c.....Sept 15 1928
(Subject to call after Sept 15 1918.)
4s '09 ann $167,000c.....1926
(Subject to call at any time.)
5s '10 F-A $50,000c.....Aug 1 1930
BONDED DEBT Apr 18 '14.....$ 310,000
Assessed valuation '13 (3-5 act.).. 10,659,981
School tax (per $1,000) '13..... 5.15
INT. at Harris T. & Sav., Chicago.

WALLA WALLA CO. S. D. NO. 24.

Funding and Building Bonds.
5½s '11 ann $35,000c.....Aug 1 1921
(Subject to call $5,000 after 3 years, $5,000 after 5 years and $10,000 after 10 years.)
TOTAL DEBT Apr 18 '14.....$ 35,000
Assessed valuation '13 (3-5 act.)... 1,193,492
School tax rate (per $1,000) '13.. 11.75
Interest at County Treasurer's office.

WENATCHEE.

This city is in Chelan County. Incorporated Dec 26, 1892.

Warrant Funding Bonds.
5s '12 .... $9,500.....1932
Municipal Purpose Bonds.
5s '09 .... $40,000.....1924
5s '10 .... 50,000.....1930
General Bonds.
5½s '12 J-D $15,000.....Dec 15 1932
Water Bonds.
6s '01 .... $ 7,500.....1921
4½s '04 .... 16,000.....1924
4½s '08 .... 55,000.....1928
5½s '12 J-D 27,000.....Dec 15 1932
BONDED DEBT Dec 31 '13.....$ 220,500
Warrants outstanding 115,969
Assessed valuation '13 (60% act.).. 3,108,970
City tax (per $1,000) '13..... 17.25
Population in 1910.....4,050
INTEREST at City Treasurer's office.

WHATCOM COUNTY.

County seat is Bellingham.
Refunding Bonds. (Red. beg. in '12).
4½s J-J 160,000c.....Jan 1 1922
GEN. BD. DEBT Jan 1 '14.....$ 160,000
Assessment debt (additional)..... 29,114
Floating debt 347,875
TOTAL DEBT Jan 1 '14..... 536,989
Sinking fund and cash..... 28,963
Assessed valuation '13 (2-5 act.).. 25,718,955
State and Co. tax (per $1,000) '13 30.16
Population in 1910.....49,511
INTEREST is payable at fiscal agency in N. Y. (Equitable Trust Co.)

WHITMAN CO. S. D. NO. 59.

Refunding Bonds.
5s '06 F-A $25,000c.....1926
(Subject to call beginning 1921.)
High-School-Building Bonds.
5s '13 A-O $25,000c.....Apr 1 1933
(Subject to call beginning Apr 1 1922.)
BONDED DEBT Sept 19 '14.....$ 50,000
Floating debt Apr 24 '14..... 20,469
Assessed valuation '13 (45% act.). 1,260,327
INT. at Co. Treas. office or New York.

YAKIMA COUNTY.

County seat is North Yakima.
County Bonds.
5½s '89 A-O $80,000c & r.....1919
4s '06 Mar 80,000c & r.....1926
BONDED DEBT Sept 1 '14.....$ 160,000
Warrants out. (County funds).... 13,875
Warrants out. (road dist. funds)... 32,795
Cash in road funds..... 7,389
Sinking fund and cash (Co. funds) 120,274
Uncollected tax due (Co. funds).. 155,592
Assessed valuation '14 (½ act.).. 37,246,145
State and Co. tax (per $1,000) '13 18.86
Population in 1910 (Federal).....41,709
Population in 1914 (local).....50,465
INTEREST in N. Y. and San Francisco.

(Compiled by the Commercial and Financial Chronicle.)

Attention is called to the announcement on page 11

Bonds of public service companies, amply secured by property and earning power, can now be purchased at prices to yield from 5% to 6%. Bonds of such companies located in thriving cities and supplying the necessities of the public in transportation, light, heat and power are little affected by fluctuations in business conditions.

We shall be glad to send offerings and detailed information upon request.

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Messrs. GERBRÜDER SCHICKLER	Berlin

Members

NEW YORK, BOSTON, PHILADELPHIA and CHICAGO STOCK EXCHANGES

Attention is called to the announcement on page 11

CORPORATION
SECTION

E. H. ROLLINS & SONS

FOUNDED 1876

INVESTMENT BONDS

E. H. ROLLINS & SONS' SHARE IN CALIFORNIA'S DEVELOPMENT

During the last twenty years the financial and commercial growth of the State of California has been the greatest in its history and almost unparalleled by that of any other section of the United States. Foreseeing this growth and the consequent demand for capital necessary to develop the natural resources and wealth of the State, E. H. Rollins & Sons, Investment Bankers, opened in 1894 a branch office in San Francisco and were

THE FIRST BOND HOUSE ESTABLISHED IN CALIFORNIA.

Since then through the purchase of Municipal Bonds they have assisted in the upbuilding and improvement of practically every section of the State, and by furnishing Public Service Corporations with large sums required for their development they have been financially associated with the remarkable growth of most of the important companies in the California Public Utility field.

Following are the chief California Public Utility Corporations whose bonds have been purchased by E. H. Rollins & Sons and their associates to an amount of approximately $100,000,000. Their annual gross earnings are now in excess of $35,000,000.

*American River Electric Co.
*Bay Counties Power Company.
*Blue Lakes Water Company.
California Delta Farms, Inc.
California Electric Generating Co.
Coast Valleys Gas & Electric Co.
*Edison Electric Co. of Los Angeles.
*Fresno Traction Company.
Great Western Power Company.
Huntington Land & Improvement Co.
Long Beach Consolidated Gas Co.
*Los Angeles Gas & Electric Co.
Los Angeles Gas & Electric Corp.
Los Angeles Railway Corporation.
Market Street Cable Railway Co. (S. F.)
*Mutual Electric Light Company.
Oakland Transit Company.
*Oro Water, Light & Power Company.
Petaluma & Santa Rosa Rwy. Co.
San Francisco, Napa & Calistoga Rwy.
Santa Barbara Gas & Electric Co.
Southern California Edison Co.
*Stockton Gas & Electric Corp.
*United Electric Gas & Power Co.
Western Power Company.
Western States Gas & Electric Co.

*Ten issues of bonds put out by the above companies have, since E. H. Rollins & Sons handled them, become underlying liens. The issues in question are indicated by a star.

Since 1894 E. H. Rollins & Sons and their associates have purchased over $5,000,000 of State of California bonds for harbor and highway purposes. They have furnished funds for the improvement of all of its important counties, cities and many of its minor political subdivisions, including over $10,000,000 for the reconstruction and improvement of the City of San Francisco and the construction of the Panama-Pacific International Exposition; also about $24,500,000 for general civic improvements for the City of Los Angeles, including the important Owens River Aqueduct. The activities of E. H. Rollins & Sons along the above lines represent the furnishing of approximately $62,000,000 to the State of California and ninety-two of its counties, municipalities and political subdivisions.

In the Public Utility field the financing arranged through E. H. Rollins & Sons has enabled—

The extension of the street railway systems in San Francisco, Los Angeles and Oakland;

The development of the Bay Counties Power Company which was the first company in the world to successfully transmit electric power over a long distance;

The completion of Southern California Edison Company's original hydro-electric installation on the Kern River and its steam station of 63,000 H.P. near Los Angeles;

The construction and extension of the Great Western Power Company's hydro-electric installation (now 82,000 H. P.) on the Feather river and its storage reservoir in Big Meadows. This reservoir, when fully developed, will be, next to the lake impounded by the Asuan Dam in Egypt, the largest artificial body of water in the world.

Write for information regarding California's progress, the probable effect the Panama Canal will have upon its future, its Public Utility Corporations, and the safeguards furnished to the conservative investor by its laws.

As E. H. Rollins & Sons have head offices in Boston and New York and branches in the important financial cities of Chicago, Philadelphia, Denver, Los Angeles and San Francisco, they are familiar with most of the important Public Utility Companies and general financial conditions throughout the country. On request information and advice as to the soundness of Municipal and Corporation Bonds will be gladly given to prospective purchasers or holders of securities.

E. H. Rollins & Sons, after careful investigation by their attorneys, engineers and commercial experts, have purchased for their own account bond issues of cities and corporations located in all parts of the United States. Circulars describing Corporation Bonds yielding from 5% to more than 6%, and State, County and Municipal issues yielding from 4% to more than 5% will be forwarded on request.

FIRST NATIONAL BANK BUILDING
SAN FRANCISCO

SECURITY BUILDING
LOS ANGELES

BOSTON	NEW YORK	CHICAGO	DENVER	LONDON
200 Devonshire St.	43 Exchange Place	234 So. LaSalle St.	Int'l Trust Bldg.	5 Copthall Court

Attention is called to the announcement on page 11

Public Service and Miscellaneous Corporations

of the Pacific Coast

Alaska Packers' Association, *San Francisco, Cal.*

The operations of the company consists of catching and packing of salmon in Alaska and Puget Sound waters. The company owns and operates a fleet of steamers, sailing vessels, canneries and hatcheries.

Capitalization.

Stocks—	Authorized.	Outstanding.
Common	$7,500,000	$5,750,000
Funded Debt—		
Bonds	2,000,000	815,000

Physical Property.

The company owns 9 ships, 12 barks, 1 barkentine, 3 schooners and 63 steamers and launches, a total of 88 vessels appraised at $1,505,850. The company operated in 1913 14 canneries in Alaska and 3 on Puget Sound and 2 salmon hatcheries in Alaska. From 68,760,000 red salmon eggs taken in 1912 at these two hatcheries, 62,603,000 fry were liberated in 1913. 44,109,160 red salmon eggs were taken at the two hatcheries in 1913. The company also owns and operates a ship yard at Alameda on San Francisco Bay. The company carries its own insurance on all its property and operations. The insurance fund in 1913 was $1,841,248.39, of which $1,537,500 is invested in bonds.

Statistics.

The following table shows the number of canneries operated and cases packed:

1904—21—1,170,474	1907—16—1,100,035	1910—15— 971,716
1905—16—1,139,721	1908—16—1,160,477	1911—16—1,053,015
1906—16—1,044,676	1909—17—1,338,254	1912—15—1,202,779
	1913—17—1,504,415	

Earnings.

1910 $517,009—1911 $631,899—1912 $372,832—1913 $148,380

Officers.

Henry F. Fortmann, Pres. — Isaac Liebes, Treas.
Louis Sloss, V.-P. — A. K. Tichenor, Secy.
William Timson, V.-P. — G. E. Geary, Cashier.

Amalgamated Copper Co., *New York, N. Y.*

The company is a holding company and does not operate any mining, milling or smelting properties.

Subsidiary Companies.

Anaconda Copper Mining Co. — The United Metals Selling Co.

Capitalization.

Stocks—	Authorized	Outstanding
Common	$155,000,000	$153,887,900
Funded Debt—		
2 year, 5% gold notes, due March 15, 1915	12,500,000	12,500,000

Physical Property.

The company owns the entire capital stock of the United Metals Selling Co. It owns a controlling interest in the Anaconda Copper Mining Co. ($79,609,150 out of the capital stock $108,312,500). It also owns $3,080,000 of the capital stock of the Green-Cananea Copper Co. and 150,000 shares of the Inspiration Consolidated Copper Company.

Earnings.

Year	Net† Earnings.	Dividends.	Balance.
1910	$5,963,968	$3,077,758	$2,886,210
1911	6,048,896	3,077,758	2,971,138
1912	6,647,006	3,847,198	2,799,808
1912 (8 mo. ending 12/31)	6,595,611	3,847,198	2,748,413
1913	8,871,799	9,233,274	*361,475

*Deficit.
†Net earnings are shown after deducting operating expenses and taxes.

Dividends.

	02	03	04	05	06	07	08 to 11	12	13	14
Per cent	2½	2	2	4½	7	7	2 yrly	4	6	1½-1½	1½

Officers.

John D. Ryan, Pres. — A. H. Melin, Sec'y and Treas.
D. B. Hennessy, Asst. Sec'y and Asst. Treas.

American Smelting and Refining Co., *and the* American Smelters Securities Co. *New York.*

The operations of these companies consist of mining or otherwise acquiring gold, silver, copper, lead and other ores; dealing in such ores and their products; and of smelting, refining, milling or otherwise treating same.

Subsidiary Companies.

(Amer. S. & R. Co.)	A. S. Steamship Co.	Federal Lead.
Con. K. C. S. & R. Co.	Nat'l Metallurg. Co.	Garfield S. Co.
U. S. Zinc Co.	(Amer. S. S. Co.)	Selby S. & L. Co.
Carbon C. & C. Co.	Balt. Cop. S. & R. Co.	Tacoma S. Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred:		
A. S. & R. (7% cum.)	$50,000,000	$50,000,000
A. S. & S. (a) (6%)	17,000,000	17,000,000
A. S. & S. (b) (5%)	30,000,000	30,000,000
Common		
A. S. & R.	*65,000,000	50,000,000
Funded Debt—Bonds		
A. S. & S.	30,000,000	†30,000,000
A. S. & S. convertible 6s, Feb. 1st, 1926	15,000,000	15,000,000

*$15,000,000 issued to retire the A. S. & S. 6 per cent convertible Debentures.
†Owned by the A. S. & R. Co.

Physical Property.

These companies own and operate mining properties in Mexico, Colorado, Missouri, California, Washington, Utah. They also own and operate smelting and refining plants in Utah, Montana, Nebraska, Colorado, Illinois, New Jersey, Mexico, Arizona and elsewhere. The principal merchantable products are bar gold and silver, pig lead, electrolytic copper and blue vitrol.

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest and Dividends.	Balance.
1911	$15,112,125	$10,571,502	$8,020,000	$2,551,502
1912	16,759,499	11,079,676	8,020,000	3,059,676
1913†	13,429,993	9,756,540	8,020,000	1,736,540

*Net earnings are shown after deducting operating expenses and taxes.
†Reduction in earnings during 1913 due entirely to the disturbed conditions in Mexico.

Sources of Gross Revenue.

	Smelting, Refining, etc.	Mining Properties	Interest, Rents, etc.
1912	$12,568,835	$3,113,105	$1,077,560
1913	10,926,254	1,185,154	1,318,525

Dividends.

	05	06	07	08	09	10	11	12	13
A. S. & R. common pct	5½	7	7½	5	4	4	4	4	4

Officers.

Daniel Guggenheim, Pres. — Judd Stewart, Gen. Aud. & Asst. to Pres.
Barton Sewell, V.-Pr. — Frank W. Hills, Comptroller.
Edward Brush, V.-P. & Asst. P. — Lucius A. Chapin, Asst. Treas.
S. W. Eccles, V.-P. — W. E. Merris, Sec'y.
Edgar L. Newhouse, V.-P. — F. R. Foraker, Asst. Gen. Coun.
Isaac Guggenheim, Treas. — & Asst. Sec'y.
John N. Steele, Gen. Coun. — R. P. Reese, Auditor.

The Armsby Company of New York, *New York, N.Y.*

The company is engaged in packing and distributing at wholesale throughout the United States, Canada and Europe, dried fruits, canned fruits, and walnuts; and in selling at wholesale on a commission basis similar products for other smaller packing companies. The company handles the entire distribution in the United States of salmon canned by the Alaska Packers' Assn., the largest concern of its kind in the world. The company's central business organization is in San Francisco. It maintains branches in New York, Boston, Chicago, and Los Angeles.

Subsidiary Companies.

J. K. Armsby Co. of Illinois.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred (7% cum.)	$500,000	$485,000
Common	500,000	437,000

Physical Property.

The company owns and operates 16 plants for preparing and packing its various products at the following points: Los Angeles, Armona, San Jose, Fresno, Visalia, Suisun, Marysville, Sunnyvale, Stockton, Healdsburg, Gilroy, Sanger, Vacaville, and Winters, in California, and at Vancouver, Wash., and Dallas, Oregon; also owns warehouse and office building in San Francisco. The company owns all of the capital stock of the J. K. Armsby Company of Illinois and a large interest in the Central California Canneries; also owns stock interests in the Pacific Coast Seeded Raisin Co. and valuable trade mark rights.

Earnings.

	Net Earnings after all charges
1910	$ 87,214
1911	110,098
1912	172,060
1913	170,912

Officers.

J. K. Armsby, Pres. — F. A. Aplin, V. P.
G. N. Armsby, V. P. — A. W. Porter, V. P.
E. P. Sills, V. P. — A. M. Lester, Sec.
E. R. Armsby, Treas.

Associated Oil Co., *San Francisco, Cal.*

The company transacts a general business in the acquiring of oil properties, leasing of oil rights, producing, manufacturing, refining, transporting and distributing oil in California and throughout the United States and territories.

Subsidiary Companies.

Associated Pipe L. Co.
Amalgamated Oil Co.
Pioneer Midway Oil Co. Cons.
Sterling Oil & De. Co.
West Coast Oil Co.
Calif. Coast Oil Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
*Common	$40,000,000	$40,000,000
Funded Debt—		
Bonds	30,000,000	15,685,000

*Control owned by Southern Pacific Co.

Physical Property.

Of the California oil properties held in California, the company owns in fee, according to latest returns, 36,511 acres, and has under leases (20 years) 2,125 acres. Mineral locations, 3,200 acres.

These properties are in Kern, Fresno, San Luis Obispo, Santa Barbara, Contra Costa and Kings counties. The company also owns refineries, distributing plants, railway equipment and a fleet of 13 vessels. It has selling agencies in the principal cities of Nevada, Arizona, California and in Portland and Hawaii. The company also owns controlling interest in all the subsidiary companies above mentioned and stock interest in a number of other companies.

The company had on hand Dec. 31, 1913, 8,595,145 bbls. of oil, an increase for the year of 488,529 bbls.

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1910	$22,385,117	$ 3,007,902	$ 553,688	$ 2,454,214
1911	20,337,684	2,594,933	828,687	1,766,246
1912	16,772,618†	2,049,093	818,648	1,230,445
1913	17,871,693	2,606,666	784,254	1,822,412

*Net earnings are shown after deducting operating expenses and taxes and dep.
†Loss is largely due to change in methods of accounting.

Officers.

Wm. Sproule, Pres.
J. A. Chanslor, V.-P.
F. H. Buck, V.-P.
J. R. Lewis, V.-P.
F. B. Henderson, Asst. Genl. Mgr.
P. G. Williams, Secretary.
W. A. Sloan, Treas.
C. L. Coppage, Asst. Sec'y.
R. G. Page, Assistant Secretary.

Booth Fisheries Co., *Chicago.*

The company is engaged in buying and selling at wholesale and retail fish, oysters and all sea foods, and operates in the Atlantic and Pacific oceans and on the Great Lakes. Its distributing branches number more than 100 which are located in the most important cities of the United States.

Subsidiary Companies.

N. W. Fish Co. of Washington.
Booth C. S. Co. of Ill.
Booth C. S. Co. of Minnesota.
U. S. & D. T. Co., Minnesota.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred (1st cum. 7%)	$10,000,000	$2,200,000
Common	10,000,000	5,000,000
Funded Debt—		
Bonds	5,000,000	3,520,000
Bonds on cold storage plants		187,500

Physical Property.

The company owns its 100 distributing plants above mentioned and producing stations on the Great Lakes and the North Pacific Coast with some minor stations on smaller inland waters. Four public cold storage plants are owned and the more important stations are equipped with freezing plants. The company owns and operates a line of passenger and freight boats on Lake Superior and has fishing fleets on the Great Lakes and Pacific Ocean. The company has also obtained concessions from the Newfoundland government. It owns the entire capital stock of the Northwestern Fisheries Co.

Statistics.

Sales 1911, $14,558,432.59 1912, $16,717,161.58 1913, $17,554,490.75

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1911	$3,849,304	$582,156	$180,091	$402,065
1912	4,585,085	703,705	299,735	403,969
1913	4,806,481	525,238	314,786	210,452

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

A. B. Carpenter, Pres. & Treas.
K. L. Ames, V.-P.
W. G. Weil, Sec'y & Asst. Treas.
W. F. Cochran, Asst. Sec. & Treas.

California Delta Farms, Inc., *Los Angeles, Cal.*

The company operations consist of the reclamation by levee construction and drainage of delta lands of the San Joaquin River in Contra Costa and San Joaquin counties; placing reclaimed land under irrigation by pumping systems and the sale and lease of such lands for agricultural purposes.

Subsidiary Companies.

Holland Land & Water Co.
Empire Navigation Company.

Capitalization.

Stocks—	Authorized	Outstanding in Hands of Public.
Common	$7,500,000	$7,500,000
Funded Debt—		
Bonds	3,500,000	2,593,000

Physical Property.

The company owns approximately 45,500 acres of land valued Dec. 31, 1913, at $8,307,425; its permanent improvements consisting of canals, buildings, pumping plants, bridges, telephone lines, floodgates, dry dock, wharves and levees valued at $1,129,206; 12 dredges and other machinery and equipment valued at $360,481. Mortgages held by the company aggregate $484,081; its rent role from lands leased total $328,231.70 for 1914.

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1913	$545,993	$419,367	$80,562	$338,805

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

Lee A. Phillips, Pres.
Isaac Milbank, V.-P.
John B. Miller, V.-P.
Geo. A. Atherton, Gen'l Mngr.
Howard S. Dudley, Sec'y & Treas.
Geo. M. Burton, Ass't Sec'y.

California Fruit Canners, *San Francisco, Cal.*

The company is engaged in canning and preserving of fruits and vegetables throughout California, and in the sale and distribution of their products.

Capitalization.

Stocks—	Authorized	Outstanding
Common	$3,500,000	$3,000,000

Physical Property.

Owns and operates about 75 per cent of the vegetable and fruit canneries in the state of California. The company owns interests in a number of other companies similarly engaged. Valuation of such holdings, together with real estate, machinery and operating plants was $3,192,260 as of February 28, 1914.

Earnings.

Year	Net Earnings	Div.	Surplus and Contingent Reserve Fund
1910	$381,175	$208,195	$1,407,936
1911	416,725	208,195	1,506,359
1912	603,025	208,195	1,700,029
1913	739,261	208,195	1,992,862
1914	603,051	333,545	2,129,136

Dividends.

Every year since 1900 at the rate of 7.20 per cent annually. Dividend paid monthly except for 7 months, May to November, 1906.

Officers.

William Fries, Pres.
S. L. Goldstein, V.-P. & Treas.
R. I. Bentley, V.-P. & Gl. Mgr.
Francis Cutting, Vice-Pres.
Chas. B. Carr, Sec.

California Oregon Power Company, *San Francisco, Cal.*

The company furnishes electric light and power to the territory extending from Castilla, Cal., on the south to Glendale in Oregon on the north; east to Klamath Falls in Oregon, and west to Etna in California. It also furnishes water to two communities. Thirty-three cities and towns in northern California and southern Oregon are served by this company. Its primary lines extend over 400 miles, through Shasta-Scott-Butte Valleys in California and Klamath-Rogue River Valleys in Oregon.

Subsidiary Companies.

Rogue R. Elect. Co. Sisk. E. Pr. & L. Co. Klamath Power Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Common	$10,000,000	$10,000,000
Funded Debt—		
Bonds	10,000,000	5,600,000

Physical Property.

The company owns and operates 7 hydro-electric plants with an aggregate development of 71,250 hp. and a possible development of 160,000 hp.; also 400 miles of high tension transmission lines and the water works at Klamath Falls, Ore., and Dunsmuir, Cal.

Officers.

J. W. Churchill, Pres.
J. D. McKee, V.-P.
J. P. Churchill, Treas.
A. J. Rosborough, Sec'y.

California Wine Association, *Winehaven, Cal.*

The operations of the company consist of the growing and making of wines and brandies and the sale and distribution of these products.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred (6% cum.)	$ 7,000,000*	$1,426,260
Common	13,000,000*	4,754,200
Funded Debt—		
Bonds	7,000,000	4,495,000

*$5,000,000 each of pref. and com. authorized in 1913 to provide for convertible feature of debentures.

Physical Property.

The company owns approximately 50 parcels of real estate in 14 counties of California, wineries, distributing plants, etc., valued at $1,731,392* with an approximate annual production capacity of 20,000,000 gals. It also owns interests in the capital stock of other companies similarly engaged amounting to $7,128,048*. Stock inventory of wines, etc., $3,250,605.*

*As of December 31st, 1913.

Officers.

H. R. Kittredge, Pres. — J. Frowenfeld, 2nd V.-P. & Treas.
C. O. G. Miller, 1st V.-P. — W. Hanson, V.-P., Sec. Gn'l Mngr.
J. A. O. Covik, Ass't Sec'y.

Coast Counties Gas & Electric Co., *San Francisco.*

The company furnishes electric light and power and gas in Santa Cruz, San Benito and Santa Clara counties, Cal. The company purchases a part of its power from the Pacific Gas & Electric under a long term contract; also operates the electric railways in Santa Cruz and vicinity.

Subsidiary Companies.

Coast Co. L. & Pr. Co. Union Traction Co. Big Creek Lt. & Pr. Co.
S. Benito L. & Pr. Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred (6% cum)	$2,000,000	$1,000,000
Common	2,000,000	1,000,000
Funded Debt—		
Bonds	1,839,000	1,580,000

Physical Property.

The company owns and operates one hydro-electric and 2 steam plants with a combined development of 3,346 hp.; 75 miles of transmission lines and 531 miles of distributing lines, 6 substations; owns gas plants at Santa Cruz, Watsonville, Hollister and Gilroy; the Union Traction Co. operates 18 miles of standard gauge track in Santa Cruz and thence to Capitolia. The company's municipal franchises are perpetual—county franchises on highways run until 1946-1959. The Company owns all the capital stock of its subsidiary companies, except the Union Traction company, which it controls.

Statistics.

	Consumers Served.		
Year.	Gas.	Electric.	Total
1909	1,912	3,095	5,007
1910	2,017	3,539	5,556
1911	2,725	4,627	7,352
1912	3,161	4,862	8,023
1913	3,281	5,530	8,811

Earnings.

	†Gross Revenue.	*Net Earnings.	Interest.	Balance.
1909	$209,989	$ 87,130	$ 57,575	$ 29,555
1910	252,104	113,037	63,560	49,477
1911	289,115	143,134	69,560	73,574
1912	319,940	161,032	72,560	78,543
1913	356,508	143,174	78,543	64,631

†Gross earnings include profit from Union Traction Co. operations. Deficit in 1913.
*Net earnings are shown after deducting operating expenses and taxes.

Officers.

S. W. Coleman, Pres. & Gen. Mgr. — R. M. Hotaling, Vice President.
L. W. Pryor, Secretary and Treasurer.

Coast Valleys Gas and Electric Co.,

San Francisco, Cal.

The Company owns and operates the electric business in Salinas, Monterey, Pacific Grove and King City; the gas business in Salinas, Monterey and Pacific Grove; the water business in Salinas and King City; together with an electric distribution system for power and lighting service in the Salinas Valley between Salinas and King City.

Capitalization.

Stocks—	Authorized	Outstanding
*Preferred (7%)	$2,000,000	$2,000,000
*Common	3,000,000	3,000,000
Bonds	10,000,000	900,000

*The stock of this company is controlled by the United Rys. Inv. Co. through the Cal. Ry. & Power Co.

Physical Property.

All power is purchased from Sierra & San Francisco Power Company, but the Company owns three steam stations having total capacity of 1,375 K. W. The Company also owns 65 miles of high tension transmission line, 8 sub-stations aggregating 5,100 K. W., and 210 miles of distribution system. The gas plants at Salinas and Monterey have, respectively 400,000 and 500,000 cubic feet daily capacity. Gas is distributed through 3 miles of high pressure and 39 miles of low pressure mains.

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1913	$227,704	$94,503	$59,813	$34,690

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

C. N. Black, Pres. — H. F. Jackson, V.-P. & Gen'l Mgr.
G. W. Bacon, Vice-Pres. — F. J. Blanchard, Sec'y and Treas

General Petroleum Co., *Los Angeles, Cal.*

The company owns, leases, and develops oil lands and constructs and operates pipe lines, refineries, distributing plants and equipment, etc., and buys and sells oil and its products.

Subsidiary Companies.

Trumble Refining Co. — General Pipe Line Co. of Calif.

Capitalization.

Stocks—	Authorized.	Outstanding
Common	$50,000,000	$34,814,600
Funded Debt—		
Bonds	25,000,000	12,477,300
Conv. serial 2 yr. notes, 1915	3,000,000	2,868,000

Physical Property.

The company owns 23,644 acres of oil lands in California, and 24,500 in Mexico; tanks with combined capacity of 2,512,800 barrels; 3 refineries with daily capacity 35,000 bbls. Owns 73% of stock General Pipe Line Co. of California and controlling interest in Trumble Refining Co.

Officers.

John Barneson, Pres. — Virgil F. Shaw, Ass't Sec'y.
Jas. T. Currie, 1st V.-P. — B. C. Donham, Ass't Sec'y.
Wm. Weir, 2nd V.-P. — Robert Mitchell, Treas.
C. R. Stevens, Sec'y.

Great Western Power Co. of California,

San Francisco, Cal.

The company furnishes electric light and power to a territory including 11 counties in California, and having a total area of 8,600 square miles.

Subsidiary Companies.

California Electric Generating Co. — City Electric Co.

Capitalization.

*Stock—	Authorized	Outstanding
West. Power Co. of N. J., pref. 6%	$ 6,000,000	$ 6,000,000
West. Power Co. of N. J., com	14,670,000	14,670,000
Funded Debt—		
Bonds, Gt. West. Power Co. and subsidiaries	35,000,000	23,645,000
West. Power Co. of N. J., notes coll. tr. 6s, due 1915	1,250,000	1,250,000

*The stock of the Great Western Power Co. is all owned by the Western Power Co. of New Jersey. The latter has no bonded indebtedness.

Physical Property.

The company owns at Big Bend, California, 18 miles above Oroville and 154 miles northwest of San Francisco, a hydro-electric plant with a capacity of 55,000 H. P. its power being transmitted to Oakland over two circuits to sub-stations at Sacramento, Brighton, Cowell and Oakland, each sub-station supplying customers within a radius of 25 miles; a reservoir of 82,000,000,000 gallons capacity at Big Meadows, which, with the falls on the north fork of the Feather River, with an ultimate possible development of 550,000 H. P.; also owns a steam electric power station in Oakland, developing 15,000 H. P. and a steam power station at North Beach, San Francisco, developing 28,000 H. P. Power is transmitted from Big Bend station over double circuit steel tower line to Oakland and thence by cable to San Francisco.

Statistics.

	1912	1914	Increase	% Inc.
Customers served	4,228	15,010	10,782	255

Earnings.

Year	Gross Revenue and other Income	*Net Earnings	Interest	Balance
1910	$ 928,786	$ 646,122	$ 592,828	$ 53,294
1911	1,938,158	1,179,352	842,267	337,885
1912	2,313,699	1,303,216	1,017,572	285,644
1913	2,930,068	1,964,099	1,183,751	780,348

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

Mortimer Fleishhacker, Pres. — Frank M. Tompkins, Treas.
Guy C. Earl, Vice-Pres. — Harley P. Wilson, Sec.
Herbert Fleishhacker, Vice-Pres. — William H. Spaulding, Asst Sec.
Harley P. Wilson, Vice-Pres. — Charles E. Maynard, Asst. Treas.

Great Western Power Company's storage reservoir (Lake Almanor) on the North Fork of the Feather River, Plumas County, California—the largest artificial reservoir in the State of California. The lake is over 10 miles in length, has an area of 30 square miles and contains 82,000,000,000 gallons of water, at an elevation of 4,450 feet above sea-level. The equalized river flow resulting from this vast storage reservoir is utilized at the Big Bend Power House where is generated 75,000 continuous electrical horsepower.

Great Western Power Company System of California

The Great Western Power Company of California had its origin in the year 1901, in the study of water power possibilities covering the northern half of the State of California. This study resulted in the elimination of those possibilities which were either expensive or unreliable and in the discovery of the great water supply of the North Fork of the Feather River, the unusually large natural underground storage in its water-shed, and the vast storage site known as the Big Meadows. In connection with the great storage facility was the possibility of dropping this equalized water within a reasonably short section of river, including the famous Big Bend, through a total vertical head of 4,000 feet.

The result of this extensive survey was presented to a group of capitalists and shortly afterward land was purchased for reservoir sites, water rights were acquired, and the original Western Power Company of California was organized in the spring of 1901. To this company all land and water rights acquired were conveyed.

In September, 1906, the Great Western Power Company of California, the present operating company, was organized, and acquired all of the physical properties of the former company. At the same time the Western Power Company of New Jersey, a holding company, was formed, which acquired and now holds all of the stock (except qualifying directors' shares) of the Great Western Power Company of California. This is a non-operating company and has no bonded debt. Development of the property was at once begun, and in December, 1908, the initial development at Big Bend, of 60,000 horsepower, was placed in operation. Shortly afterward the California Electric Generating Company erected a 15,000 horsepower auxiliary steam plant at the Oakland terminal of the hydroelectric transmission line, which plant is now leased to the Great Western Power Company. In July, 1911, the City Electric Company, comprising a 28,000 horsepower steam plant and an extensive distribution system in San Francisco, was acquired.

An extension of the Big Bend plant of 60,000 horsepower has since been under way and is partially completed, making the present capacity of this station 75,000 horsepower. The present installed generating capacity of the system is therefore 118,000 horsepower.

The Big Meadows dam has recently been completed to a height of eighty feet. The Great Lake Almanor, formed by the waters impounded by this dam, is already over ten miles in length and covers thirty square miles of territory. In this vast reservoir, which is at an elevation of 4,450 feet above sea level, there are at present eighty-two billion gallons of water, a sufficient supply to equalize the river flow so as to generate continuously at the present Big Bend plant, even through the driest years, 75,000 horsepower. This same water can further be used at the four other power sites controlled by the company, where it will generate 240,000 additional horsepower.

Power from the Big Bend station is transmitted over a double circuit steel tower transmission line, operating at one hundred thousand volts, and which is one hundred and fifty-four miles in length, extending through the fertile Sacramento Valley to the many substations in eleven counties and to the Oakland terminal station, which supplies the territory contiguous to San Francisco. Hydroelectric power is transmitted from the Oakland terminal of this transmission line through the agency of two 11,000-volt submarine cables (the largest of their kind in the world) under San Francisco Bay to the city of San Francisco. Through the aid of eight hundred miles of distributing lines and thirteen substations, the company is now serving the needs of sixteen thousand consumers, having a connected load of 165,000 horsepower, in eleven counties in the central portion of the state.

The Big Meadows dam will be even further enlarged and will ultimately impound 1,250,000 acre feet of water, forming an artificial lake larger than any yet constructed. The final development of this water-shed will ultimately avail 550,000 continuous horsepower, and the stored water, after passing through the five powerhouses (falling through a vertical drop of 4,000 feet) will afford irrigation for over one-half million acres of land in the great Sacramento Valley.

This hydroelectric power project is one of the largest and most economical of development in the United States, and is particularly valuable in view of the great demand for electric service in this community.

Adv.

Attention is called to the announcement on page 11

The Holt Manufacturing Company, *Stockton, Cal.*

This company manufactures and sell patented machinery, consisting of Gas Tractors, Combined Harvesters, Plows and Harrows, together with the necessary supplies and lubricants. All these goods are sold under their registered trade mark CATERPILLAR. Its products are protected by patents in the United States, England, France, Germany, Australia, South America, and all principal foreign countries. The trade mark CATERPILLAR, together with its equivalent in the principal foreign languages, has been registered in practically every country in the world.

In 1913 a consolidation was effected by which all subsidiary companies were absorbed and became a part of the parent company.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred (7%)	$1,000,000	$603,000
Common	500,000	500,000

Physical Property.

The company owns and operates two factories, one at Stockton, Cal., employing about seven hundred and fifty men, and one at Peoria, Ill., employing about two hundred men.

The Stockton plant manufactures tractors, plows and harvesting machinery, and its products are shipped all over the Pacific Coast, including Alaska and the west coast of South America; also the Pacific Islands, China, Australia, and New Zealand.

The Peoria factory, which is devoted exclusively to the manufacture of CATERPILLAR tractors, supplies the trade east of the Rocky Mountains, the eastern part of South America, and the European trade.

The company sells direct to the consumer, and it has twelve American branches and district sales agents. Fourteen foreign agencies handle the trade abroad.

Its real estate, buildings, machinery equipment, etc., was appraised as of December 31, 1913, at $1,161,398. This amount allowed a reserve for depreciation of $259,418.09. Stock on hand at the same date was $1,486,916.

Statistics.

Sales—

Year 1903	$ 787,815	Year 1909	$1,365,889
" 1904	614,264	" 1910	1,737,532
" 1905	784,170	" 1911	2,245,799
" 1906	1,027,544	" 1912	2,262,489
" 1907	1,046,948	" 1913	2,874,044
" 1908	1,058,726		

Officers.

Benj. Holt, Pres. — C. Parker Holt, Treas.
R. S. Springer, V. P. — P. Ehrenfeldt, Sec'y & Auditor.
M. M. Baker, V. P. — C. L. Neumiller, Gen'l Counsel.
P. E. Holt, V. P. & Gl. Man.

Home Telephone Co. *Los Angeles, Cal.*

The company operates an independent telephone system covering Los Angeles, South Pasadena and Huntington Park. Its lines connect with other independent systems in southern California through the U. S. Long Distance Tel. & Tel. system.

Capitalization

Stocks—	Authorized	Outstanding
Preferred (5%)	$3,000,000	$3,000,000
Common	3,000,000	3,000,000
Funded Debt—		
Bonds	7,500,000	4,318,000

Physical Property.

The company owns and operates an extensive system of exchanges and connections in the territory which it covers and is in active competition with the Pacific Tel. & Tel. Co. in that territory.

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1910	$1,079,261	$543,579	$241,650	$301,929
1911	1,293,365	556,140	244,021	313,119
1912	1,514,501	707,894	247,247	460,647
1913	1,720,499	690,430	440,480	515,176

*Net earnings are shown after deducting operating expenses and taxes.

Officers

A. B. Cass, Pres. — E. P. Murphy, Sec'y.
E. J. Marshall, Vice-President. — M. H. Hellman, Treas.
F. W. Rea, Asst. Treas.

Los Angeles Gas and Electric Corp., *Los Angeles, Cal.*

This company operates a complete equipment for the manufacture and distribution of gas in Los Angeles, Pasadena, South Pasadena, Alhambra, San Gabriel, San Marino, Watts, Eagle Rock, Huntington Park, Inglewood, and other suburban districts of the City of Los Angeles. The company controls 85% of the gas business in the City of Los Angeles and all of the gas business in the other cities above named, serving an approximate population of 570,000. It also operates a plant for the distribution of electric light and power in the City of Los Angeles.

Capitalization.

Stocks—	Authorized.	Outstanding.
1st preferred	$ 4,000,000	None.
2nd preferred	6,000,000	None.
Common	20,000,000	$10,000,000*
Funded Debt—		
Bonds	15,000,000	8,686,000

*The capital stock of this company is owned by the Pacific Lighting Corporation, San Francisco, California.

Physical Property.

The rated capacity of the gas generating plant, owned and operated by the company, is 31,140,000 cu. ft. The holder capacity is 14,950,377 cu. ft. The company owns 1,247 miles of gas mains and on July 1st, 1914 had outstanding 124,055 meters. The rated capacity of the electric plant, owned and operated by the company, is 25,650 H. P.; miles of overhead main wire, 2,410; underground conduits, 21 miles. On July 1st, 1914, the company had outstanding 37,166 electric meters; with a total connected load of 67,021 H. P. The value of physical property of the corporation without allowing for good will and franchise, $20,600,000.

Statistics.

Comparative statement of Meters Installed.

January 1st,	1910	1911	1912	1913	1914
Gas	74,353	84,773	96,108	107,952	122,020
Electric	20,844	24,130	27,295	31,324	36,086
Totals	95,197	108,903	123,403	139,276	158,106

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1910	$3,334,861	$1,236,563	$260,507	$ 976,056
1911	3,893,189	1,552,479	328,934	1,223,545
1912	4,178,176	1,842,964	396,405	1,446,559
1913	4,527,164	1,937,570	400,943	1,536,627

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

W. B. Cline, Pres. & Gen'l. Mgr. — C. S. Vance, 3rd V.-P.
Wm. Baurhyte, V.-P. — R. M. Adams, Sec'y. & Treas.
C. P. Houghton, 2nd V.-P. — T. P. McCrea, Ass't. Sec'y.
Horace Cline, Ass't. Treas.

Los Angeles Railway Corp., *Los Angeles, Cal.*

The company operates the entire street railway system in the city of Los Angeles and in the adjacent territory which includes 5 other towns. The present population of the territory served is estimated at 516,000 with an average annual increase of 15%. The company does not operate generating plants but purchases its power from the Pacific Light & Power.

Subsidiary Companies.

City Railway of Los Angeles.

Capitalization.

Stocks—	Authorized.	Outstanding.
*Common	$20,000,000	$20,000,000
Funded Debt—Bonds	25,500,000	20,000,000

*Owned by Mr. H. E. Huntington.

Physical Property.

The company owns 357.88 miles of track and operates 385.82 miles, of which 85.15 miles is over private right of way; 875 cars, of which 601 are PAYE type; 321 miles of transmission lines and 10 sub-stations. The company also owns all the capital stock of the City Ry. Co. of Los Angeles. 82% of the company's franchises run beyond 1940.

Statistics.

	Gross Income.	Miles of Road Operated.	Cars Operated.	Passengers Carried.
1900	$ 835,627	74.85	110	17,874,308
1911	5,843,377	360	800	117,731,241
1912	6,616,924	363	800	135,658,571
1913	7,005,433	375	875	145,437,439

Earnings.

	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1911	$5,817,561	$1,693,676	$1,002,500	$ 691,176
1912	6,542,468	2,207,059	1,002,500	1,204,559
1913	7,005,945	2,306,931	1,002,500	1,304,431

*After deducting operating expenses and taxes.

Officers.

H. E. Huntington, President. — C. A. Henderson, Sec. and Treas.
Howard Huntington, Vice-President and General Manager.

Montana Power Co., *New York.*

The company owns and operates electric power and lighting plants in the territory extending from the western boundary of Montana, 540 miles to Billings, and from the southern border of the state to within a few miles of the Canadian boundary, embracing the state's most productive territory and including nearly all of its important cities and towns. The company furnishes electric power

and light to 51 cities and towns and sells power to the lighting and traction lines of Helena and to the electric railways of Butte; also sells power for mining and smelting operations. The company operates irrigation systems of both the gravity and pumping type.

Subsidiary Companies.

Great Falls Power Co. — Montana Power Transmission Co.
Thompson Falls Power Co. — Montana Res. & Irrigation Co.

Capitalization.

Stocks— Rate	Authorized.	Outstanding
Preferred (7 per cent cum.)	$25,000,000	* $ 9,700,000
Common	75,000,000	† 49,557,600
Funded Debt—		
Bonds	75,000,000	24,938,000

*$28,200 in treasury of Great Falls Power Co.
†$22,500,000 under voting trust with dividend deferred. Of the remainder $225,800 in treasury of Great Falls Power Co.

Physical Property.

The total present capacity of all plants controlled by the company is 102,000 H. P. The present output reaches a maximum of 86,000 H. P. with an average of 62,000 H. P. The estimated ultimate development of water power sites undeveloped and under construction is 253,000 H. P., of which it is expected that 160,000 H. P. will have been developed by 1918. The total then developed will be 262,000 H. P., and the grand total, developed and undeveloped, 355,000 H. P. The company owns all of the capital stock of the subsidiaries above mentioned.

The Great Falls Power Company and Thompson Falls Power Company have entered into contracts with the Chicago, Milwaukee & Puget Sound Ry. Co. for electrical power to operate about 450 miles of its main transcontinental line. Under these contracts, which cover a period of 99 years and go into effect on or before Jan. 1st, 1918, the railway company is bound to take and pay for 20,000 kilowatts (26,500 H. P.), and it has taken an option on additional power to the extent of 30,000 kilowatts (about 40,000 H. P.), which option must be exercised, ½ in five years and ½ in ten years, but not less than ½ of the amount under option must be taken, if any.

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1912	$3,029,875	$1,991,469	$786,510	$1,204,959
1913	3,359,198	2,421,424	904,555	1,516,869

*Net earnings are shown after deducting operating expenses and taxes.

Dividends.

January, 1913, to date quarterly dividends of 1¾% on the preferred and ½% on the common have been paid.

Officers

John R. Ryan, Pres. — Frederick Strauss, V.-P.
Max Hebgen, V.-P. — C. R. McCabe, V.-P.
Alfred Jaretski, V.-P. — Walter Dutton, Sec'y & Treas.

Mt. Whitney Power & Electric Co., *Visalia, Cal.*

The company furnishes electric light and power to a territory composed of all of Tulare Co. and a part of Kern Co., Cal., including the towns of Visalia, Tulare, Portersville, Lindsay and Exter.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred	$1,800,000	$ 750,000
Common	3,200,000	1,875,000
Funded Debt—		
Bonds	5,000,000	2,477,000

Physical Property.

The company owns and operates 5 hydro-electric stations on the Kaweah and Tule Rivers and a storage reservoir with 130,000,000 cubic feet capacity; a steam turbine generator plant at Visalia developing 10,000 h. p.; 178 miles of high tension transmission and 823 miles distributing lines.

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1910	$356,148	$193,332	$121,976	$ 71,356
1911	413,628	232,620	105,124	127,496
1912	451,862	233,074	119,613	113,451
1913	592,882	336,425	138,201	198,224

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

John Coffee Hays, Pres. — E. E. Baker, Sec.
B. M. Maddox, Vice-Pres. — Patrick Longan, Treas.
Harris Hammond, Vice-Pres. — R. D. Hanna, Asst. Sec.

National Ice & Cold Storage Company of California, *San Francisco, Cal.*

The company harvests natural ice in the Sierra Nevada Mountains, manufactures artificial ice in various factories located in the principal cities of California and does a diversified business in storage of all classes of meats, poultry, fruits and vegetables, car icing, and the sale of ice for wholesale and retail consumption throughout a territory embracing practically the entire state of California.

Subsidiary Companies.

Pacific I. & C. S. Co. — Tahoe Ice Company. — Sonora Ice & C. S. Co.
California Ice Co. — Mt. Ice Co. of Cal. — South. Calif. Ice Co.
Petal'a I. & C. S. Co. — Floriston Ice Co. — Dist. I. & C. S. Co.
Marys'le I. & C. S. Co. — S. Pablo I. & C. S. Co. — Cone I. & C. S. Co.
Stock. I. & C. S. Co. — Fresno Con. Ice Co. — San J. I. & C. S. Co.
Watson. I. & C. S. Co. — Con. Ice & C. S. Co. — Valley Ice Co.
Oakland I. & C. S. Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred (7% cum.)	$ 5,000,000	$ 200,000
Common	15,000,000	15,000,000
Funded Debt—		
Bonds	15,000,000	3,530,000

Physical Property.

The company owns and operates four natural ice plants located at Floriston, Iceland, and Polaris, Cal., with a producing capacity of 50,000 tons per annum and a storage capacity of 37,000; and wholly or partly owns and operates 25 artificial ice factories in the following cities: San Francisco (2), Los Angeles (2), Sacramento, Oakland (2), Stockton (2), Fresno (2), Red Bluff, Vallejo, Sonora, Berkeley, Riverside, Santa Rosa, Watsonville, Merced, Petaluma, San Jose, Marysville, San Bernardino, Porterville and Bakersfield, with a daily capacity of 1,011 tons and a storage capacity of 46,775 tons of ice. Plants, equipment, real estate, etc., were appraised at $5,750,000 on May 22, 1913, and since that date new construction to the amount of more than $500,000.00 has been completed or nearly completed.

Net Earnings.

1910 ..... $363,116.00 — 1912 ..... $460,157.00
1911 ..... 420,496.00 — 1913 ..... 487,733.58

Officers.

N. Ohlandt, Pres. — F. B. Whipple, 2nd V.-P.
Jno. A. Buck, 1st V.-P. — Joseph Martin, Gen'l Mngr.
J. T. Donahue, Sec'y & Treas.

Nevada California Power Co., *Denver, Colo.*

The operations of the company and its subsidiaries cover the mining districts of Goldfield, Tonopah, Millers, Manhattan, Round Mountain, Rhyolite, Blair and other towns and cities of Western Nevada, where a large proportion of the company's output is required for mining operations and lighting. The company also, through its subsidiary, The Southern Sierras Power Company, serves districts in Inyo, Kern, San Bernardino and Riverside counties, California, and through a long term contract with the Coachella Valley Ice & Electric Company and the Holton Power Company, will supply power for distribution to the Coachella and Imperial Valleys, California, as far south as the Mexican border. The territory served, including that reached by the lines of the Pacific Power Company (an allied and inter-connected company), covers a total distance, running north and south along the western portion of Nevada and the eastern portion of California, of nearly 600 miles. In addition to furnishing power for mining and irrigation, the company owns and operates local distributing systems in the cities and towns of Bishop, Big Pine, Lone Pine, Randsburg, Inyokern, San Jacinto, Hemet, Perris, Elsinore and Corona, California; also electric plant and distributing system at San Bernardino and Barstow, California; also wholesale current to the cities of Redlands and Riverside, California, for municipal use.

The company operates an extensive system of telephone lines covering practically the same territory served by its electrical transmission lines as far south as San Bernardino, California, with exchanges in many small towns and working arrangement with the Pacific Telephone and Telegraph Company.

Subsidiary Companies.

The Southern Sierras Power Co. — Bishop Light & Power Co.
The Sierras Construction Co. — Corona Gas & Electric Light Co.
Interstate Telegraph Co. — Hillside Water Co.

Capitalization.

Stock—	Authorized	Outstanding
Common	$5,000,000	$5,000,000
Bonds	8,000,000	5,413,000

Physical Property.

The company's physical properties consist of five (5) hydro-electric plants on Bishop Creek, California; aggregate capacity 22,000 kilowatts; also auxiliary steam plant at San Bernardino, California; capacity 9,000 kilowatts; 553 miles of transmission, 560 miles of distributing and 643 miles of telephone lines. The company owns a ranch and irrigating system at Bishop, California, covering about 5,000 acres.

Earnings.

Year	Gross Revenue	*Net Earnings	†Interest	Balance
1910	$744,644	$512,451	$175,083	$339,409
1911	772,846	560,025	167,323	392,161
1912	872,844	580,572	157,438	423,134
1913	998,457	513,696	120,228	375,283

*Net earnings are shown after deducting operating expenses and taxes.
†Less interest earned.

Officers.

Delos A. Chappell, Pres. — Lawrence C. Phipps, Jr., Treas.
Rodney Curtis, Vice-Pres. — G. S. Wood, Asst. Treas.
G. S. Wood, Vice-Pres. — A. S. Cooper, Asst. Treas.
A. B. West, Vice-Pres. — W. E. Porter, Sec.
J. R. Dixon, Gen. Counsel.

Northern California Power Co., Cons.,

San Francisco, Cal.

The company operates 5 hydro-electric plants in Shasta Co., Cal., and 2 in Tehama Co., serving 46 cities and towns in these counties and in Glenn and Colusa Cos. with electric light and power. It also operates gas and water works in Redding and Willows, and gas works in Red Bluff.

Subsidiary Companies.

Northern Calif. Pr. Co. Battle Creek Pr. Co. Sac. Valley Pr. Co.
Keswick Elec. Pr. Co. The Redding Wr. Co. The Sac. Val. Pr. Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred (6% cum.)	$2,000,000	
Common	10,000,000	$10,000,000
Funded Debt—		
Bonds	11,900,000	7,157,200

Physical Property.

The company owns and operates the following hydro-electric plants in Shasta Co., Volta, Kilarc, Coleman, South Cow Creek, Snow Creek, and the following in Tehama County-South Power House, Inskip, with combined output of 49,800 H. P. Through consolidation, it acquired and owns and operates the gas plants and containers, mains, etc., in Redding, Red Bluff and Willows, and the water works in Redding and Willows. Operates under State Constitution and Public Utilities Act, requiring no franchises. It also owns the entire capital stock of its two subsidiaries—Sacramento Valley Power Co. and the Sacramento Valley Power Company.

Earnings.

Year.	Gross Revenue.†	*Net Earnings.	Interest.	Balance.
1910	$588,545	$406,843	$122,834	$284,009
1911	654,898	421,291	156,403	264,888
1912	727,562	412,736	282,788	129,948
1913	822,043	488,383	350,666	137,717

*Net earnings are shown after deducting operating expenses and taxes.
†Includes store and ranch account.

Officers.

H. H. Noble, Pres. — E V. D. Johnson, Mgr.
A. S. Carman, V.-P. — Edw. Whaley, Sec'y.
F. Reis, Jr., V.-P. — W. H. Pearce, Asst. Sec'y.

Oakland, Antioch & Eastern Railway,

San Francisco, Cal.

The company's operations, with those of its direct connections and tributaries, extends through six counties in the State of California, connecting the populous bay section, including San Francisco and Oakland, through the San Ramon Valley to the capital city of Sacramento.

Operates through cars, over its connections, to Chico and Marysville. It is unusual in the fact that with approximately 100 miles of main line it is tributary to a population of 1,000,000, more than one-third of the total population of the State of California.

It has entrances and terminal facilities in Sacramento and Oakland, carrying its cars, by arrangement with the Key Route, directly to the Key Route mole; thus having the quick ferry service to San Francisco.

A bridge permit has been granted by the War Department to bridge the Suisun Straits, which, when completed will give this road the only all rail entrance into the Bay Cities.

Subsidiary Companies.

Oakland & Antioch Ry. San Ramon Val. R. R.

Capitalization.

Stocks—	Authorized.	Outstanding.
Common	$10,000,000	$ 9,200,000
Funded Debt—		
Bonds	7,100,000	4,600,000
Six % four year gold notes	700,000	317,000

Physical Property.

The Company has 36 passenger and motor cars and a large equipment of flat, box and express cars. Four electric passenger and freight locomotives and two steam locomotives. Operates four substations. Roadbed is 70 lb. Ferro titanium rail, all rock ballasted.

Officers.

W. Arnstein, Pres. — H. C. Breeden, V.-P.
S. L. Naphtaly, V.-P. — H. A. Mitchell, Sec'y & Gl. Mgr.

Oro Electric Corporation,

San Francisco, Cal.

The company furnishes light, water and power to the city of Oroville and vicinity.

Subsidiary Companies.

Oro Water Light & Power Co. Oroville Light & Power Co.
Oro Development Co.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred (6% cum.)	$ 3,500,000	$3,500,000
Common	6,500,000	6,500,000
Funded Debt—		
Bonds	11,750,000	11,275,000

Physical Property.

The company owns undeveloped hydro-electric properties on Deer Creek and Tehama Creek in Tehama Co., Cal.; a hydro-electric plant on Yellow Creek, Plumas Co., with a capacity of 50,000 h. p.; a steam relay plant at Stockton. The ultimate possible development of the hydro-electric properties owned by the company is 130,000 h. p. The company owns the entire capital stock of its subsidiaries.

Officers.

J. W. Goodwin, Pres. — E. B. Bumsted, Vice-Pres.
L. J. Holton, Vice-Pres. — J. K. Moffiitt, Sec.
R. Leo Van der Naillen, Gl. Mgr.

Pacific Coast Company,

Seattle, Wash.

The company is engaged either directly or through constituent subsidiary and affiliated corporations in real estate, railroad, steamship, lumber, coal and mining enterprises in the entire Pacific Coast territory from Mexico to Alaska.

Subsidiary Companies.

Columbia & Puget Sd. R. R. Co. Pacific Coast Coal Co.
Pacific Coast Railway. Pacific Coast Steamship Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
1st preferred (5%)	$1,525,000	$1,525,000
2nd preferred	4,000,000	4,000,000
Common	7,000,000	7,000,000
Funded Debt—		
Bonds	5,000,000	5,000,000
Serial notes due 1916-1919	1,000,000	750,000

Physical Property.

The company owns and operates 18 steamships; 57 miles of standard gauge railroad from Seattle to Franklin, 105 miles of narrow gauge road in California from Port Luis to Los Olivos and Branches; docks and wharves at Seattle, Tacoma, San Francisco, Skagway, Nome and other points; coal lands at various points in Washington with an aggregate acreage of 12,180 acres; real estate holdings in San Francisco, Seattle, Portland and Alaska ports, and more than 3,000 acres of timber and logged off land in Washington. The company also owns a controlling interest in the stock of its subsidiaries and ½ the capital stock of the Juneau S. S. Co., and the Ketchiken Wharf Co. Railroad equipment: 19 locomotives, 20 passenger cars, 687 freight cars.

Earnings.

Fiscal year ends June 30.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1911	$7,833,437	$1,363,678	$250,000	$1,113,678
1912	7,525,491	1,115,090	250,000	865,090
1913	7,989,080	1,225,260	250,000	975,260
1914	7,198,136	855,736	259,375	596,361

*Net earnings are shown after deducting operating expenses and taxes.

Dividends.

	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14
1st preferred, %	5	5	5	5	5	5	5	5	5	5
2nd preferred, %	5¼	6	6	4¾	4¼	9	6	6	6	5½
Common, %	5¼	6	6	4¾	4¼	9	6	6	6	5½

Officers.

Wm. M. Barnum, Pres., N. Y. — C. C. Fay, Sec'y & Treas, N. Y.
J. C. Ford, V.-P. & Gen'l Mgr. Seattle. — J. W. Smith, Asst. Sec'y & Gen'l Auditor, Seattle.

Pacific Electric Railway Co.,

Los Angeles, Cal.

The Company operates an interurban electric railway system centering at Los Angeles, Cal., extending into the counties of Los Angeles, San Bernardino, Riverside and Orange and serves the cities of Pasadena, San Bernardino, Riverside, Colton, Redlands, Pomona, Ontario, Santa Ana, Long Beach, Venice, Ocean Park, Santa Monica, Redondo, San Fernando, Owensmouth and Lankershim.

Estimated population of territory served, including Los Angeles, 900,000.

Subsidiary Companies.

Pacific Electric Land Company.

Capitalization.

	Authorized	*Outstanding
Common stock	$100,000,000	$74,000,000
Bonds	156,130,000	56,528,000

*Owned by Southern Pacific Co.

Physical Property.

The company owns and operates: 536 miles of single track, 313 miles of second track, 98 miles of sidings, etc.; total, 947 miles. It operates under lease: 28 miles of single track; 18 miles of sidings, etc.; total, 46 miles. It operates under contract: 9 miles of single track, .3 miles of sidings, etc. It operates under trackage rights: 1 mile of single track, sidings, etc. Total miles of line in operation June 30, 1914, 1,005 miles.

The company owns and operates—

	With Electric Equipment.	Without Electric Equipment.
Passenger Cars	610	13
Freight Cars	...	1,228
Combination Cars	17	....
Express Cars	26	.....
Work Cars	21	31
Locomotives	49	1
Miscellaneous	7	10
Total equipment in operation June 30, 1914	730	1,283

The company's real estate holdings consist of right of way, station grounds and other lands used in the operation of the road. Power is purchased from Southern California Edison Company and Pacific Light & Power Company. The company's lines are operated under franchise ordinances granted by cities and counties. All franchise payments are a percentage of a pro rata proportion of the company's gross receipts based on the mileage of line covered by the franchise to the mileage of the entire system.

Statistics.*

Mileage of Line in Operation—	1912.	1913.	1914.
Owned and operated	907.194	930.050	947.872
Operated under lease	40.516	46.187	46.934
Operated under contract	6.220	6.220	9.440
Operated under trackage rights	.....	.....	1.525
Total miles operated	953.930	982.457	1,005.771

Capital Expenditures—	1913.	1914.
Road	$1,614,511	$2,365,919
Equipment	502,765	205,280
General Expenditures	30,556	60,162
Floating Equipment	48,598	.....
Total Expenditures	$2,196,430	$2,631,361

	1912.	1913.	1914.
Car Mileage	27,320,758	30,709,718	30,787,415
Passengers Carried	69,751,537	78,803,806	82,084,424

*All figures are for fiscal year ending June 30th.

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1912†	$8,645,504	$2,574,518	$2,195,944	‡$378,574
1913	9,399,080	2,655,653	2,531,540	‡124,113
1914	9,467,483	2,366,911	2,820,839	§453,928

*Net earnings are shown after deducting operating expenses and taxes.

†Figures for 1912 are for constituent companies for months of July and August, 1911, and for Pacific Electric Railway Company (of Sept 1, 1911), for balance of year.

‡Surplus.

§Deficit.

Officers.

Paul Shoup, Pres.
A. K. Van Deventer, V. P.
H. A. Culloden, Sec. & Auditor.
I. W. Hellman, Treas.
Frank Karr, Attorney.
J. McMillan, Gen. Manager.
Geo. E. Pillsbury, Chief Engineer.
F. L. Annable, Gen'l Supt.
D. W. Pontius, Traffic Manager.
Geo. L. Bugbee, Land Agent.

Pacific Gas & Electric Co., *San Francisco, Cal.*

The operations of the Pacific Gas & Electric Company extend into thirty counties of the State of California, having an area of 37,452 square miles, and a population at the 1910 census of 1,324,476. The company's business field embraces the populous San Francisco Bay section and the fertile Sacramento and San Joaquin Valleys, including the cities of San Francisco, Oakland, Sacramento, San Jose and 167 other communities. The company owns and operates properties employed in the manufacture and sale of gas and electricity for light, heat and power, in street railway operation and in the sale of water.

The franchise rights of the company are either unlimited in time or extend, with minor exceptions, beyond the maturity of its bonds, and the larger part of the transmission lines is located on private right of way.

Subsidiary Companies.

Cal. Gas & Elec. Corp.
Bay Counties Pr. Co.
Nev. Co. Elec. Pr. Co.
Yuba Elec. Pr. Co.
Valley Counties Pr. Co.
Cal. Cen. G. & E. Co.
Oak'ld G. L. & H. Co.
Sac. Elec. G. & Ry. Co.
Cent. Elec. Ry.
Blue Lakes Wtr. Co.
United Gas & Elec. Co.
So. Yuba Water Co.
Cent. Cal. Elec. Co.
Std. Elec. Co. of Calif.
Subn. Lt. & Pr. Co.
Livermore W. & P. Co.
S. F. Gas & Elec. Co.
Pac. Gas Imp. Co.
Edison Lt. & Pr. Co.
Mut. Elec. Lt. Co.
Met. Gas Corp.

Capitalization.

Stocks—	Authorized.	
1st preferred (6 per cent)	$ 50,000,000	.....
Preferred (6 per cent)	10,000,000	$10,000,000
Common	100,000,000	32,109,300
Funded Debt—		
Five per cent. gold notes due 1915	7,000,000	7,000,000
General and refunding 5s	150,000,000	24,986,000
Divisional bonds	Closed	*50,499,800

*In addition to this amount, $2,344,200 bonds are held alive in Sinking Funds.

There are also outstanding $3,572,000 additional General and Refunding Mortgage 5's and $5,000,000 General Llen 6 per cent bonds, "Serles A," all of which are pledged as collateral for the Issue of notes.

Physical Property

The company has electric power plants with a total generating capacity of 233,928 H. P., of which 123,740 H. P. is hydro-electric. It owns and operates forty miles of street railway track in Sacramento, the capital of the state. The gas department has 2,374 miles of mains.

In November, 1913, the company completed the first section of an important hydro-electric development on the Yuba and Bear rivers, including an immense storage reservoir at Lake Spaulding, over 33,000 H. P. of generating capacity, and a steel tower transmission line, 110 miles in length, to the center of the company's distributing system. There was expended on this development to December 31, 1913, approximately $7,000,000, from which practically no return was received during 1913, but which should result in substantially increasing the net earnings of the company in future years. When the ultimate capacity of this development, namely 190,000 H. P., has been reached, it is believed that this will rank as one of the cheapest developments of its size and character in the United States. Furthermore, it will make the company independent of outside sources of power supply, will enable it to effect a substantial saving as compared with the present cost of current purchased, and will give it a source of energy.

The company owns in fee all of the property of its subsidiary companies. (*See map opposite*)

Statistics.

The following table shows the growth during the past seven years in the number of consumers served by the company:

	Gas.	Electricity.	Water.	Steam.	Total
December 31, 1907	122,304	55,704	5,263	....	183,271
" 31, 1908	131,235	63,073	5,601	....	199,909
" 31, 1909	140,670	71,643	5,939	....	218,252
" 31, 1910	153,566	84,329	6,430	....	244,325
" 31, 1911	177,510	102,198	7,398	....	287,106
" 31, 1912	196,133	116,666	8,071	222	321,092
" 31, 1913	208,269	132,355	8,511	282	349,417
June 30, 1914	211,132	137,916	8,873	307	358,288

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1907	$11,342,140	$ 5,115,911	$ 2,854,264	$ 2,261,647
1908	12,657,305	5,864,586	3,021,722	2,842,864
1909	13,491,288	5,959,712	2,988,522	2,971,191
1910	14,044,596	6,123,255	3,006,256	3,116,999
1911	14,604,609	6,390,537	3,254,133	3,136,404
1912	14,744,651	6,313,090	3,568,943	2,744,147
1913	16,202,337	6,871,131	3,902,045	2,969,085

*Net earnings are shown after deducting operating expenses and taxes.

Sources of Gross Revenue.

Year.	Electricity.	Gas.	St. Ry.	All Other.	Total.
1907	$6,316,629	$4,086,372	$431,800	$507,339	$11,342,140
1908	7,059,088	4,494,945	414,326	688,946	12,657,305
1909	7,678,665	4,860,034	452,396	500,193	13,491,288
1910	7,899,224	5,202,284	509,152	433,936	14,044,596
1911	7,823,903	5,735,219	533,520	511,967	14,604,609
1912	7,672,570	5,805,865	547,187	719,029	14,744,651
1913	8,230,782	6,547,595	572,913	851,047	16,202,337

OFFICERS.

F. G. Drum, Pres.
John A. Britton, V.-P. & Gl. Man.
A. F. Hockenbeamer, V.-P. & Treas.
J. E. Gladstone, 3rd V.-P.
D. H. Foote, Sec'y and Asst. Tr.
Joseph C. Love, Asst. Treas.
Chas. L. Barrett, Asst. Sec'y.
M. K. Parker, Asst. Sec'y.

Pacific Light and Power Corporation,

Los Angeles, Cal.

The Corporation does a general lighting and power business in Southern California, centernig about Los Angeles; a large part of its business being the supply of current to the Los Angeles Railway, with a trackage of 385½ miles of street railway, and to the Pacific Electric Railway, which operates approximately 560 miles of urban and interurban electric road in Los Angeles and vicinity. It also sells current for lighting and power throughout Southern California, principally in the counties of Los Angeles, Riverside, San Bernardino and Orange. Next to the railway load, the most important power business is that of operating motors for irrigation purposes.

Subsidiaries.

The Mentone Power Company. Kern River Company.
Son Joaquin & Eastern Railroad Company.

Capitalization.

Stocks—	Authorized.	Outstanding.
1st preferred (cum.)	$ 5,000,000	$ 3,057,000
2nd preferred (cum.)	10,000,000	9,975,000
Common	25,000,000	10,559,500

The majority of the stock is owned by H. E. Huntington.

MAP OF THE
PACIFIC GAS & ELECTRIC CO.
SHOWING
CITIES AND TOWNS IN CENTRAL CALIFORNIA
Supplied with Electricity, Gas and Water

Physical Property.

The company operates three steam plants of modern design, of 55,919 H. P. one of which is located in the City of Los Angeles. The eight hydro-electric plants operated have an aggregate capacity of 99,631 H. P. the largest of which is located at Big Creek in Fresno County, with a present capacity of approximately 80,400 H. P. Other hydro-electric plauts are on the Kern River and in the mountains about the San Bernardino Valley.

The company operates about 1,245 miles of high tension transmission line, of which 241 miles is 150,000 volt steel tower, aluminum cable line. Its distributing system consists of 1,976 miles of overhead, and an underground system in the congested district of Los Angeles City.

Statistics.

Year.	No. of Meters.	No. of Motors.	H. P. in Motors.	Incandescent Lamps.	Arc Lamps.
1898	950	125	458	19,775	421
1903	2,919	640	7,306	73,393	1,232
1908	8,184	959	11,654	202,646	2,257
1913	24,112	2,423	32,560	474,638	4,424

Earnings.

	Gross Earnings.	Operating Expense.	Net Earnings.	Interest.	Balance.
1908	$ 49,444	$ 28,338	$ 21,105	$ 12,467	$ 8,638
1903	602,980	467,695	135,285	73,087	62,197
1908	1,796,899	957,592	839,307	518,404	320,904
1913 .	2,852,061	1,574,474	1,277,587	516,385	761,202

Officers.

H. E. Huntington, Pres.
G. C. Ward, V.-P
W. E. Dunn, V.-P.
A. N. Kemp, Treas. & Compt.
W. J. Gracey, Purchasing Agent.
E. R. Davis, Director.
O. V. Showers, Sec'y.

Pacific Lumber Co., *San Francisco, Cal.*

The company operates exclusively in redwood, having extensive logging and milling operations in Humboldt County, Cal., where they manufacture various grades of redwood lumber, of which they are large exporters. The company maintains general offices in San Francisco, and branch offices in New York, Chicago, Kansas City, Los Angeles, and Saginaw, Mich.

Capitalization.

Stocks—	Authorized	Outstanding
Common	$10,000,000	$9,133,300
Funded Debt—		
Bonds	2,250,000	2,000,000

Physical Property.

The company owns 65,021 acres of redwood stumpage, of which, as of December 31, 1913, 48,099 acres were virgin timber. Owns and operates two mills at Scotia, Humboldt County, Cal., producing annually 110,000,000 board feet; storage yards; dry kilns, etc.; and wharves at Field's Landing on Humboldt Bay.

Officers.

C. W. Penoyer, Pres.
Wm. H. Murphy, V. P.
J. H. Emmert, Sec.
Junius H. Browne, Gl. Sales Mgr.
Donald McDonald, Gen'l Mgr. (Scotia).
H. M. Robinson, Treas.

Pacific Power & Light Co., *Portland, Ore.*

The company serves a large territory in Washington, Oregon and Idaho including important towns such as Walla Walla, Pendleton, Pasco, North Yakima, The Dalles and Astoria. It does a gas and electric business in the Columbia, Yakima and Walla Walla Valleys and in Astoria, Ore. The company furnishes electric light and power and power service to 42 communities, gas service to 7, street railway service to 2, interurban railway service to 3 and water service to 4, having an aggregate population of 111,000 (estimated).

Subsidiary Companies.

Walla Walla Valley Ry. Co.

Capitalization.*

Stocks—	Authorized.	Outstanding.
Preferred (7% cum.)	$ 3,500,000	$2,000,000
2nd preferred (7% cum.)	2,500,000*	1,500,000
Common	6.000,000*	6,000,000
Funded Debt—		
Bonds	30,000,000	6,076,000

*This company is controlled by the American Power & Light Co. (Electric Bond & Share Co.) which owns all the common and second preferred stocks.

Physical Property.

The company owns and operates electric generating plants with an aggregate capacity of 27,610 hp. (of which 20,760 hp. is hydro-electric), gas holders of 439,500 cu. ft. capacity; 749 miles of distributing lines; 444 miles of high voltage transmission lines; 119 miles of gas mains and 89 miles of water mains. It owns all of the capital stock (except directors' qualifying shares) of the Walla Walla Valley Ry. Co. which operates the electric railways of Walla Walla and an interurban line thence to Milton, Oregon. The company's franchises are either unlimited or extend for a long period.

Statistics.

Customers served	Elec. L. & P.	Gas	Water
1912	13,952	4,597	4,162
1913	15,285	5,759	4,442

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1912	$1,257,364	$609,327	$288,070	$321,257
1913	1,288,059	624,385	341,656	282,729

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

Guy W. Talbot, Pres.
E. W. Hill, V.-P.
F. G. Sykes, V.-P.
A. S. Greiner, V.-P.
G. E. Claflin, V.-P.
E. W. Cookingham, V.-P.
J. E. Davidson, V.-P.
Geo. F. Nevins, Sec'y.
E. P. Summerson, Treas.

Pacific Telephone & Tel. Co., *San Francisco, Cal.*

The company operates services throughout the entire states of Washington, Oregon and California and in portions of Nevada and western Idaho. The estimated population of the territory served is 4,250,000.

Subsidiary Companies.

Sunset Tel. & Tel. Co. Bell Tel. Co. of Nevada.

Capitalization.

Stocks— Rate	Authorized.	Outstanding.
Preferred*	$32,000,000	$32,000,000
Common*	18,000,000	18,000,000
Funded Debt—		
Bonds		41,664,000

*The American Tel. & Tel. Co. owns $21,727,200 of the preferred and $9,027,000 of the common stock.

Physical Property.

Real estate, plants, general equipment, materials and supplies throughout the territory valued Dec. 31st, 1913, at $82,153,884; 647,993 connected stations. The work now in progress includes a new pole line across Nevada connecting with the Mountain States Tel. & Tel. Co., which will make long distance service between San Francisco and New York. The total miles of wire Dec. 31st, 1913—1,806,169. The company owns the entire capital stock of its subsidiary companies. (*See map opposite*)

Statistics.

	No. of Connected Stations.	Miles of Wire.
December 31, 1910	446,622	1,302,853
" 31, 1911	503,626	1,439,019
" 31, 1912	595,186	1,724,802
" 31, 1913	647,993	1,806,169

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1910	$14,667,112	$ 2,875,413	$ 1,676,208	$ 1,199,205
1911	16,070,112	3,462,274	2,186,147	1,276,127
1912	18,244,786	4,261,431	2,433,659	1,827,772
1913	19,593,536	4,333,922	2,177.333	2,256,589

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

H. T. Scott, Chairman of Board.
G. E. McFarland, Pres.
H. D. Pillsbury, V.-P.
J. M. Quay, V.-P.
F. W. Eaton, Sec'y and Treas.
J. C. Nowell, Gen'l. Manager.
F. C. Phelps, Gen'l. Auditor.

Phelps, Dodge & Co., *New York.*

The corporation is a holding company and does not operate directly any mining or other plants. The statistics which follow refer to the holdings and operations of its subsidiary companies. These companies operate copper mines in Arizona and New Mexico and in the state of Sonora, Mexico, and coal mines in New Mexico. The companies operate in connection with these mines smelters and reduction plants, etc., for the treatment of their own and other ores, and coke ovens in connection with their coal mining operations. The company also buys and sells ores of various kinds and their products. The mercantile company operates seven stores and branches in connection with the operations of all the subsidiary companies.

Subsidiary Companies.

Copper Queen Consolidated Mining Co.
Detroit Copper Mining Co. of Arizona.
Moctezuma Copper Co.
Burro Mountain Copper Co.
Stag Canon Fuel Co.
Phelps Dodge Mercantile Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Common	$50,000,0000	$45,000,000

Physical Property.

The company owns the entire issued capital stock (except shares required to qualify directors) of its subsidiary companies as follows: Copper Queen ($2,000,000); Detroit Copper ($1,000,000); Moctezuma ($2,600,000); Burro Mountain ($160,000); Stag Canon ($3,000,000); Phelps, Dodge Mercantile ($2,000,000).

MAP OF

THE PACIFIC TELEPHONE & TELEGRAPH CO. SYSTEM

1098

——— THE PACIFIC TEL. & TEL. CO. LINES
—·—·— CONNECTING LINES
····· PROPOSED LINES

The extent of the physical property owned by the operating companies is shown by the following figures taken from the annual report for the year 1913:

Copper Queen Cons. Mines: Total production, 867,481 tons. Exploration and development work, 116,114 feet. Reduction department: Ore purchased, 1,041,453 tons; treated, 1,034,357 tons. Copper produced, 133,410,582 lbs. Ore reserves, 2,536,729 tons. Power plant daily development, 4,595.8 H. P. Employes, 3,661.

Detroit Copper Mining Co. Mines: Total production, 533,563. Reduction department: Ore treated, 150,695 tons. Bullion produced, 22,255,130 lbs. Exploration and development work, 18,492 feet. Employes, 1,510.

Moctezuma Copper Co. Mines: 31,292.5 feet drifting; 1,028 feet exploration work. Concentrator: Milled 603,654 tons; produced 135,057,331 tons of concentrates.

Burro Mountain Copper Co. In process of development, 3,753 feet of haulage tunnel driven.

Stag Canon Fuel Co. For production see coal and coke figures below. Development work, 30,226 feet.

Phelps, Dodge Mercantile Co. Sales, $628,932.80. Employes, 490.

Statistics.

1913

Copper & copper bearing, ores prod. (tons) 1,994,465	Copper produced (pounds) 155,665,712
Ores and concentrates smelted From companies' mines 1,035,367	Silver produced (oz.) 2,078,376
Purchased 82,874	Gold produced (oz.) ... 32,037
	Lead produced (lbs.) 5,701,628
	Coal produced (tons) 1,322,813
	Coke produced (tons) 293,090

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Dividends.	Balance.
1910	$ 9,099,910	$ 8,847,388	$5,399,875	$3,447,513
1911	7,284,508	7,134,302	5,400,000	†1,734,302
1912	10,411,535	10,285,185	6,750,000	†3,535,185
1913	9,581,495	9,407,709	7,425,000	†1,982,709

*Net earnings are shown after deducting operating expenses and taxes.

†$1,500,000 deducted for depreciation in value of stocks owned before transfer to surplus account.

Dividends.

Dividends, 1909, 12%; 1910, 12%; 1911, 12%; 1912, 15%; 1913, 16½%.

Officers.

James Douglas, Pres.	Walter Douglas, Gen'l Manager.
Cleveland H. Dodge, V.-P.	George Notman, Sec'y & Treas.
Arthur C. James, V.-P.	C. W. Parsons, Asst. Treas.
James McLean, V.-P.	F. T. Bulmer, Asst. Sec'y.

Portland Gas & Coke Co., *Portland, Ore.*

The company does the entire gas business in Portland, Ore., and suburbs, and supplies gas at wholesale to the St. Johns Gas Co. and to the Pacific Power & Light for its Vancouver, Wash., service. The estimated population served is 265,000.

Subsidiary Companies.

St. Johns Gas Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred (7% cum.)	$ 2,000,000	$2,000,000
Common	3,500,000	3,000,000*
Funded Debt—		
Bonds	15,000,000	5,796,000

*All common stock, except directors' shares, owned by American Power & Light Co. (Electric Bond & Share Co.)

Physical Property.

The company has recently put into operation an additional plant, which is one of the largest oil gas plants in the United States. This plant is located at Linnton on the Willamette River below the city limits. It has three 20-foot crude oil gas generators and a complete scrubbing, condensing and purifying system for approximately 7,500,000 cubic feet daily output, and two holders with a combined capacity of 1,185,000 cubic feet. The plant has been built to accommodate an ultimate daily generating capacity of 15,000,000 cubic feet. A sixteen-inch high pressure main connects the new plant with the company's distributing system and with its plant in Portland, which is maintained as a reserve plant.

The Portland plant, which is located on the Willamette River, in the heart of the City of Portland, has a generating capacity of 4,500,000 cubic feet daily and has a holder capacity of 3,000,000 cubic feet, including the holder capacity in East Portland.

In addition to the present holder capacity at the new plant and in Portland and East Portland, the company has under construction an additional 2,000,000 cubic foot holder in East Portland which is being built in order that there may be the most effective distributing service. This will give the company a total holder capacity of 6,185,000 cubic feet. Franchises of the company are unlimited as to time.

Statistics.

	Customers served.	Cu. ft. output.
1912	37,276	1,480,923,593
1913	40,698	1,652,926,445

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1912	$ 1,178,772	$ 579,163	$ 201,745	$ 377,418
1913	1,280,916	655,249	249,137	406,112

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

C. F. Adams, Ch. of Board.	A. S. Grenier, V.-P.
Guy W. Talbot, Pres.	E. W. Hill, V.-P.
F. G. Sykes, V.-P.	G. S. Nevins, Sec'y & Treas.

Portland Ry., Light & Power Co., *Portland, Oregon.*

The company operates all the street railways in Portland and the vicinity with the exception of three interurban lines. Its suburban lines include Oregon City, Troutdale, Cazadero and Bull Run, Oregon, and Vancouver, Wash., via the company's ferry. It furnishes a large percentage of the electric light and power in Portland and all the electric light and power in Oregon City, Salem and many other cities in the state of Oregon and in Vancouver, Wash. It also operates the gas plant at Salem. Altogether the company serves with electric light and power 26 cities and towns. Power is sold to the three interurban lines controlled by the Southern Pacific and Northern Pacific Railways, and to the street railway companies of Salem and Vancouver.

Subsidiary Companies.

Portland Ry. Co. Portland Gen'l. E. Co. Will. V. So. Ry. Co.
Ore. Wr. Pr. & Ry. Co. Mt. H'd. R. & Pr. Co. Yamhill Electric Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Common	$25,000,000	$18,750,000
Funded Debt—		
Bonds	99,100,000	34,000,000
1 yr. 5 per cent gold notes due May 1915	5,000,000	5,000,000

Physical Property.

The company owns and operates 295.7 miles (on a single track basis) of electric railways, 633 passenger cars, 522 freight, work and express cars, and 12 locomotives. It also owns and operates 5 steam stations and 5 hydro-electric plants with a capacity of 65,280 KW. and 22 sub-stations with a capacity of 28,580 KW. In addition to this equipment the company owns a building used for headquarters of light and power service, car shops, four car houses, a 9-story building in the center of the business district used for its offices; the only amusement park near the city, large tracts of land on the east side of the Willamette River valuable for terminal purposes and real estate in various parts of the city. The street railway franchises owned by the company expire in 1932 but the company has preferential rights covering subsequent franchises. The power and light franchises are unlimited. It also owns the water power at Willamette Falls, Oregon City. Power is furnished to several large pulp and paper mills.

Statistics.

	1913	1912	1911	1910
Elec. K. W. hrs.	184,200,820	169,609,004	152,244,267	120,703,715
Light & Power Cus. served ..	42,063	38,415	33,192	26,413
Operating ratio	42.5%	42.9%	43.1%	43.3%
Pass. Carried ..	94,074,368	94,876,246	91,600,993	88,310,850

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1910	$5,638,896	$2,914,518	$1,398,029	$1,516,489
1911	6,336,703	3,266,806	1,510,280	1,756,526
1912	6,642,308	3,313,397	1,760,991	1,552,406
1913	6,723,742	3,425,432	2,008,601	1,416,831

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

Franklin T. Griffith, Pres.	G. L. Estabrook, S. & A. Treas.
F. I. Fuller, V.-P.	Wm. Lilley, Ass't. Treas.
M. S. Hopkins, V.-P.	C. N. Huggins, Treas. & A. Secy.
E. W. Clark, V.-P.	F. W. Hild, Gen'l. Manager.
Herbert L. Clark, V.-P.	R. W. Shepherd, Aud. & Asst. Sec.

Puget Sound Traction, Light & Power Co., *Seattle.*

The company, through ownership or control, does substantially all of the electric street and interurban railway, and the greater part of the commercial electric lighting and power business in the Puget Sound district, including

the cities of Seattle, Tacoma, Bellingham, and Everett, Wash. It also supplies gas in the city of Bellingham. The 1910 census gave these cities an aggregate population of 370,049. The present population is estimated to be 389,500.

Subsidiary Companies.

Th Seattle Ry. Co. Whatcom Co. Ry. Lt. Pacific N. W. Traction
The Seattle Elect. Co. & Pr. Co. Puget Sound International Ry & Pr. Co.
Puget Sound Pr. Co. Pugel Sound Elec. Co.
Pacific Coast Pr. Co. Tacoma Ry. Co.

Capitalization.

Stocks—	Authorized.	Outstanding in Hands of Public.
Preferred (6 per cent cum.)	$15,000,000	$14,792,100*
Common	25,000,000	20,112,300†
Funded Debt—		
Bonds	74,000,000	34,286,000

*Includes $1,115,200 non interest bearing receipts exchangeable at par for pref. stock Jan. 15, 1916.
†Includes $1,544,500 non interest bearing certificates exchangeable at par for com. stock Jan. 15, 1916.

Physical Property.

The company owns or controls hydro-electric power plants with a present development of 74,000 H. P. and an ultimate development of 175,000 H. P.; steam stations with a present capacity of 32,550 H. P., and street and interurban railways aggregating 493.3 miles of single track. It owns 623 passenger and 435 other cars, 2 steam and 13 electric locomotivea. The company's franchises expire as follows: Tacoma, Ry., 1939; Lt. & Power, 1930; Seattle, Ry., 1934, light, 1952; Bellingham, Ry., 1941-1934, Light & Power, 1940, gas, 1941. Interurban roads operate chiefly over private rights of way. The company, directly or through subsidiary companies, owns all of the capital stock of its subsidiaries excepting that of the Puget Sound Electric Ry., which it controls.

Statistics.

	No. passengers Electric Ry. (Inc. Transfers)	No. consumers Light & Power
1913	146,635,191	36,208

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1913	$8,613,599	$3,605,224	$1,811,435	$1,793,788

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

Frederick S. Pratt, V.-P.
Alton W. Leonard, V.-P.
Guy L. Weymouth, V.-P.
James C. Trumbull, V.-P.
Thos. S. Blumer, V.-P.
Henry B. Sawyer, Treas.
Stone & Webster Management, Ass't. Managers.

San Diego Electric Railway Co., *San Diego, Cal.*

The company operates the entire electric railway syatem in San Diego and vicinity, except one short line.

Capitalization.

Stocks—	Authorized	Outstanding
Common	$5,000,000	$1,250,000
Funded Debt—		
Bonds	5,000,000	1,625,000

Physical Property.

The company owns and operates 63.49 miles of main track standard guage 60 lb. T and 114 Trilby rails; a steam generating plant in San Diego with capacity of 7200 kw. 138 pass. motor cars, and 5 pass. trail cars, and 7 miscellaneous cars. The company has franchises covering all of its lines in San Diego; such franchises expire in 1952.

Statistics.

Total number of passengers carried during past five years:

1909	10,720,995
1910	13,768,038
1911	17,935,059
1912	23,667,585
1913	27,684,826
	93,776,503

Earnings.

Year	Gross rev. incl. Miscl. Inc.	*Net earnings Miscl. inc. ded.	Bond and Other int.	Balance
1909	$ 434,144	$135,917	$28,228	$107,688
1910	547,630	137,793	41,092	96,700
1911	675,142	163,377	73,460	89,917
1912	910,532	267,243	88,750	178,493
1913	1,058,977	196,806	85,000	111,806

*Net earnings are shown after deducting operating expenses and taxes.

Sources of Gross Revenue.

Year	Passenger Revenue	Sale of Electric power	Sale of Steam	Miscl. Revenue
1909	$ 393,812	$21,288	.....	$19,043
1910	502,612	23,096	.....	21,921
1911	643,645	18,597	.....	12,899
1912	859,526	23,568	.....	27,437
1913	1,001,314	32,581	$13,078	12,002

Officers.

John D. Spreckels, Pres.
Wm. Clayton, V. P. & Mg. Dir.
H. L. Titus, Gen'l Counsel.
Claus Spreckles, Sec. & Treas.

San Francisco & Oakland Terminal Railways, *Oakland, Cal.*

(*Known as Key System.*)

The company operates street railway lines in and between Oakland, Berkeley, Richmond, Emeryville, Piedmont, Albany, San Leandro, San Lorenzo and Hayward. The system connects with San Francisco by ferry via the company's pier.

Subsidiary Companies.

San Jose Short Line. Oakland Terminal Co.

Capitalization.

Stocks—	Authorized	Outstanding
A preferred (6%)	$12,050,000	$12,050,000
B preferred	1,000,000	1,000,000
Common	15,125,000	15,125,000
Funded Debt—		
Bonds	19,997,000	16,656,000
Notes	.....	2,500,000

Physical Property.

The company owns and operates the equivalent of 257.13 miles of single track; 411 pass. cars and 66 miscellaneous cars; 1 wrecking crane and 5 ferry boats; docks and terminal facilities in Key Route Basin. Franchises expire 1933 to 1959.

Statistics.

Year	Fare Pass.	Car miles l'pass.	Car hours l'pass. yr.
1912	75,560,740	16,429,484	1,627,377
1913	77,072,203	16,318,256	1,613,907
1914	76,606,881	16,397,707	1,599,923

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1912	$4,776,873	$1,678,304	$875,389	$802,915
1913	4,676,876	1,600,805	910,012	690,793
1914	4,651,335	1,477,159	821,598	655,561

*Net earnings are shown after deducting operating expenses and taxes.

Sources of Gross Revenue.

Year	Passenger	Freight	Switching	Advertising	All other
1912	$4,281,815	$31,329	$17,615	$14,430	$331,684
1913	4,422,070	4,691	35,133	22,863	192,119
1914	4,411,022	8,691	19,212	27,888	184,522

Officers.

Geo. K. Weeks, Pres.
W. R. Alberger, V. P. & Gl. Man.
F. B. Whipple, V. P.
Angus Clark, Sec. & Asst. Treas.
Kirke Lathrop, Treas.
B. W. Fernald, Auditor.

San Joaquin Light & Power Corporation, *Fresno, Cal.*

Supplies electricity for lighting, power and pumping purposes, throughout the San Joaquin Valley, including the cities of Merced, Madera, Fresno, Selma, Hanford and Bakersfield, and 50 towns and small cities. Gas is distributed in Bakersfield, Kern, Merced, Selma; a street railway system is operated in the cities of Bakersfield and Kern and water furnished for domestic purposes in Selma and Madera. Population served, about 225,000. The rights under which the corporation operates are without limitation in point of time in the cities.

Subsidiary Companies.

San Joaquin Light & Power Co. Power, Transit & Light Co.
San Joaquin Power Co. Bakersfield & Kern Electric Ry.
Bakersfield Gas & Electric Co.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred (6 per cent cum.)	$10,000,000	$ 6,500,000
Common	15,000,000	11,000,000
Funded Debt—		
Bonds	31,670,000	7,309,000
Coll. Tr. 6 per cent notes, due 1915	.....	909,000

Physical Property

The corporation owns and has in operation four hydraulic generating plants, a steam reserve plant in Fresno, and a modern steam turbine plant in Bakersfield. The electric generating capacity of these plants amounta to 57,000 H. P. Water is received at the principal hydraulic generating plant from the Crane Valley reservoir, under a head of 1,412 feet. The company has in operation 675 miles of high tension transmission lines; the current is transformed at 20 sub-atations and distributed through 1,643 miles of distributing lines. Recently a massive dam at the outlet of the Crane Valley has been constructed, increasing capacity of the reservoir to 51,000 acre feet (12 times its former capacity); thus providing ample water to operate the hydraulic planta to their full capacity during the entire season, with a large amount of reserve.

Franchises outside of the incorporated limits, with two exceptions, extend beyond the life of the bonds, or else the transmission lines are on private right of way. About one-half the total length of transmission line will be on private right of way.

Statistics.
Consumers

	Light	Power	Gas	Water
1910	9,011	630	3,083	722
1911	11,758	810	3,918	554
1912	14,627	1,283	4,449	545
1913	16,694	1,883	4,662	563

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1910	$1,052,463	$ 677,685	$ 225,492	$ 452,193
1911	1,104,131	622,538	354,191	268,347
1912	1,401,138	864,372	450,319	414,053
1913	1,762,320	921,390	†431.288	490,102

*Net earnings are shown after deducting operating expenses and taxes.
†Exclusive of sinking fund.

Sources of Gross Revenue.

	1913	1912	1911	1910
Light	$ 632,266	$ 571,101	$ 533,599	$ 462,482
Power	800,905	514,910	306,900	258,154
Gas	176,016	153,816	96,424	95,566
Water	15,065	15,416	17,650	17,261
Railway	106,664	110,842	102,857	94,766
Miscell.	31,404	35,053	46,701	124,234
	$1,762,320	$1,401,138	1,104,131	$1,052,463

Officers.
W. G. Kerckhoff, Pres. — L. M. Farnham, Sec.
A. C. Balch, Vice-Pres. — A. E. Peat, Treas. & Comp.
A. G. Wishon, Gen'l Mgr.

Seattle Lighting Co., *Seattle, Wash.*

The company supplies all of the gas for light, heat, and fuel in the city of Seattle and its suburbs, serving a population estimated at 280,000.

Capitalization.

	Authorized.	Outstanding.
Preferred stock, 6%	$1,000,000	$1,000,000
Common stock	3,000,000	3,000,000
Bonds	12,000,000	6,293,500

Physical Property.

The company owns a modern coal and water gas plant with a generating capacity of over 5,000,000 cu. ft. per day. It has recently added a coke plant.

Statistics.

	Gas sold		Gas sold
1905	316,501,400	1910	715,491,500
1906	386,518,700	1911	776,402,700
1907	498,571,700	1912	861,910,300
1908	564,565,800	1913	973,569,300
1909	677,241,000		

Earnings.

Year	Gross Revenue.	*Net Earnings.	Interest.	Balance.
Aug. 31, 1914	$983,156	$424,117	$332,163	$91,954

*Net earnings are shown after deducting operating expenses and taxes.

Dividend Record.
Pref. 1907 to 1913., 6%; Common 1911-12-13, 2%.

Officers.
J. W. Farrell, Pres. R. C. Dawes, V. P. F. K. Lane, Treas.

Sierra & San Francisco Power Co., *San Francisco, Cal.*

The Company operates hydro-electric plants near San Francisco and a large steam power station in the City. It furnishes power to the United Railroads of San Francisco under a contract running until 1954 and general power and lighting service in its territory.

Capitalization.

Stocks—	Authorized	Outstanding
*Common	$20,000,000	$20,000,000
Funded Debt—		
Bonds	20,000,000	15,358,699

*The stock of this company is controlled by the United Rys. Inv. Co. through the Cal. Ry. & Power Co.

Physical Property.

The Company owns hydro-electric developments on the South and Middle Forks of the Stanislaus River, which, with the North Beach steam power station in San Francisco, give it generating capacity of approximately 75,000 H. P.; 500 miles of high tension transmission line, of which 234 miles are carried on steel towers; together with well constructed and equipped sub-stations and distribution systems. The property is in excellent condition, the greater part having been constructed within the past five years.

Earnings.

Year	Gross Revenue	*Net Earnings	†Interest	Balance
1912	$ 945,938	$570,559	$345,724	$224,834
1913	1,088,774	581,978	373,594	208,384

*Net earnings are shown after deducting operating expenses and taxes.
†Does not include interest on Series "B" mortgage bonds which is payable in bonds.

Officers.
G. W. Bacon, Pres. — F. J. Blanchard, Sec'y and Treas.
C. N. Black, Vice-Pres. — T. R. Hilton. Asst. Sec'y & Asst. Treas.
H. F. Jackson, V. P. & Gen'l Mgr.

Southern California Edison Company, *Los Angeles, Cal.*

The company furnishes electric light and power throughout Santa Barbara, Kern, Ventura, Los Angeles, San Bernardino, Orange and Riverside Counties, serving sixty cities, towns and intervening territory, with a population of about one million. Also operates gas distributing systems in 8 cities and towns.

Subsidiary Companies.
Long Beach Cons. Gas Company. Santa Barbara Gas & Electric Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred 6%	$ 4,000,000	$ 4,000,000
Common 6%	26,000,000	10,400,000
Funded Debt—		
Bonds	30,000,000	16,302,000

Physical Property.

The company owns and operates in parallel six hydro-electric plants on the Kern and Santa Ana Rivers and on Mill and Lytle Creeks, with an aggregate development of 42,500 h. p.; steam plants at Los Angeles, Long Beach and Redlands developing 77,300 h. p.; aggregate present development of all plants 119,800 h. p.; valuable additional water rights on the Kern River capable of ultimate development of 111,000 h. p.; one of which, Kern River No. 3—33,500 h. p.—is actively under construction; also owns half interest in Union Power Co.; hydro-electric development with capacity of 10,000 h. p. The company owns controlling interest in both its subsidiaries (L. B. Gas $640,200 preferred and common; Santa Barbara G. & E. $736,500 preferred and common).

Statistics.

No. of Consumers—	Electric.	Gas.	Total.
December 31, 1910	55,338	12,065	67,403
December 31, 1911	66,398	9,318	75,716
December 31, 1912	80,995	11,623	92,618
December 31, 1913	96,851	13,532	110,383
June 30, 1914	102,642	13,846	116,488

Earnings.

Year—	Gross Revenue.	*Net Earnings.	Interest and Amortization.	Balance.
1910	$3,384,933	$1,667,076	$651,492	$1,015,584
1911	3,738,165	1,902,280	624,829	1,277,451
1912	4,337,411	2,008,355	708,796	1,299,559
1913	4,779,280	2,348,989	813,969	1,535,020
Year ending June 30, '14	4,840,105	2,354,859	862,860	1,491,999

*After deducting operating expenses and taxes.

Dividends.

	1910.	1911.	1912.	1913.	1914.
Preferred %	5	5	5	5	6
Common %	5	5	5	5	6

Officers.
John B. Miller, Pres. — Albert W. Harris, V. P.
W. A. Brackenridge, V. P., Gen'l Man. — R. H. Ballard, Sec. and Asst. Gen. Man.
J. C. Drake, V. P. — W. L. Percey, Treas.
W. R. Staats, V. P.

Southern California Gas Co., *Los Angeles, Cal.*

The Southern California Gas Company furnishes gas to the city of Los Angeles and vicinity, which is now supplied with approximately a fifty per cent mixture of natural and manufactured gas, and in some localities with all natural gas.

In addition to the manufactured gas supplied on the above basis, the estimated output of natural gas for domestic and industrial purposes is over six billion cubic feet.

All of the natural gas is supplied by the Southern California Gas Company, either at retail to its own consumers in Los Angeles city and eighteen nearby cities and towns, or at wholesale to other distributing companies, including the Los Angeles Gas & Electric Company.

The Southern California Gas Company supplies all the manufactured gas in addition to the Natural gas distributed by the Economic Gas Company in Los Angeles City; the Long Beach Consolidated Gas Company in Long Beach and vicinity; the Southern California Edison Company in Santa Monica and vicinity; the Western Fuel & Power Company in Redondo and vicinity, and the Rodeo Land & Water Company in Beverly.

The company also supplies and distributes manufactured gas to the city of Riverside and surrounding towns in Riverside County, and in the city of San Bernardino and surrounding towns in San Bernardino County.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred (6% cum.)	$ 4,000,000	$ 875,000
Common	6,000,000	6,000,000
Bonds	10,000,000	4,030,000

*$3,118,000 face value bonds deposited as collateral securing issue of $2,338,000 Pacific Light & Power Company collateral bonds; $882,000 face value with public.

Physical Property.

The company owns and operates a generating plant in Los Angeles with a generating capacity of 8,000,000 cubic feet daily, and one at Colton in San Bernardino County with a generating capacity of 2,000,000 cubic feet daily; gas containers with an aggregate capacity of 1,420,000 cubic feet, and 600 miles of mains; leases and operates approximately 111 miles natural gas transmission line to Los Angeles city; operates Affiliated Developing Company owning 9 gas wells in Buena Vista Hills territory.

Statistics.

Consumers served.

1908	5,796
1909	7,579
1910	10,646
1911	19,801
1912	24,838
1913	*30,195

*Includes 4 wholesale consumers.

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1910	$ 256,127	$ 121,585	$ 94,579	$ 27,006
1911	454,999	198,728	135,239	63,489
1912	635,200	279,010	168,609	110,410
1913	1,038,024	322,170	209,677	112,493

*Net earnings are shown after deducting operating expenses and taxes.

Sources of Gross Revenue.

	Gas Sales, Consumers	Gas, Wholesale	Miscellaneous	Total
1910	$ 256,127	.....	.....	$ 256,127
1911	454,999	.....	.....	454,999
1912	559,279	$ 36,913	$ 39,008	635,200
1913	617,495	403,182	17,347	1,038,024

Officers.

W. G. Kerckhok, Pres. — Kaspare Cohen, Vice-Pres.
A. C. Balch, Vice-Pres. — L. M. Farnham, Sec.
A. E. Peat, Treas. & Comp.

Sperry Flour Co., *San Francisco, Cal.*

Established, 1852; Incorporated, 1892.

The company manufactures and sells flour, cereals and feeds, operating several mills in California, and one in Tacoma, Wash.; and maintains offices in 17 cities in California, in Tacoma, Wash., in Portland and Marshfield, Oregon, and in Honolulu. The company does a large export business which is handled by W. R. Grace & Co.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred (7%)	$ 600,000	$ 600,000
Common	3,600,000	3,378,300
Funded Debt—		
Bonds	500,000	500,000

Physical Property.

The company owns mills at Stockton (2), Vallejo, Fresno, Chico, Los Angeles, Marysville, Paso Robles and Salinas, Cal., and at Tacoma, Wash. On June 30, 1914, its real estate holdings, machinery, equipment, etc. (including new construction), were valued at $1,935,793 after deductions for depreciation. Grains and manufactured goods on hand inventoried $1,300,110. The surplus on that date was $422,566.

Officers.

John H. Rossiter, Pres. — B. H. Ames, Sec'y.
S. B. McNear, V.-P — Wm. Thompson, Treas.

Spokane & Inland Empire Railroad Co., *Spokane, Wash.*

The company operates electric railway lines in Spokane and thence east to Coeur d'Alene and Hayden Lake; Colfax and Palouse, Wash., and Moscow, Idaho, on the south, with an extension from Greenacres (on the eastern division) to Spokane. Outside of Spokane the road is in accordance with standard steam railroad specifications and the company transports all kinds of freight, light and heavy, exchanging with steam roads.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred rights (5% cum.)	$10,000,000	$ 6,409,100
Common	10,000,000	10,000,000
Funded Debt—		
Bonds	15,000,000	3,913,000

*Control owned by the Great Northern R. R. Co., and Northern Pacific Ry. Co.

Physical Property.

The company owns and operates 290.94 miles of track (single, sidings and spurs); 124 passenger and 36 other motor cars, 493 miscellaneous cars; 10 electric and 4 steam locomotives; valuable passenger terminal and office building in the heart of Spokane and freight terminal between the terminals of the Great Northern and Northern Pacific railroads, and has physical connection with all railroads entering Spokane. Also owns a hydro-electric plant 9 miles below Spokane, capable of developing 20,000 horsepower. The company owns a franchise to sell electric light and power in Spokane.

Attention is called to the announcement on page 11

Earnings.

Deficit reduced from $131,701 in 1911 to $78,529 in 1913. Operating ratio reduced in the same period from 68.22 per cent to 68.06 per cent.

Officers.

L. C. Gilman, Pres. W. F. Turner, Comptroller.
Waldo G. Paine, V. P. W. D. Scott, Gen. Mgr.
W. G. Davidson, Sec. & Treas.

Spring Valley Water Co., *San Francisco, Cal.*

The company furnishes water to the city of San Francisco.

Capitalization.

Stocks	Authorized	Outstanding
Common	$28,000,000	$28,000,000
Funded Debt—		
Bonds	28,000,000	21,277,000
Notes, 2 yr. 5½%, due Dec., 1915	2,000,000	1,000,000

Physical Property.

The company owns 14 pumping plants in San Francisco, San Mateo and Alameda counties, of a capacity of 75,000,000 gallons; eight city distributing reservoirs and 3 tanks. City system consists of 460 miles of pipe and 63,000 service connections. Properties in San Francisco, San Mateo, Alameda, Santa Clara and San Benito counties, 102,082 acres, and riparian rights on 51,558 acres. Reservoirs have a capacity of 32,100,000,000 gallons. The system, as at present developed, delivers approximately 40,000,000 gallons daily. Real estate water rights were appraised January 1, 1914, $65,840,485. On December 31, 1913, a condemnation suit was commenced by the city of San Francisco to acquire the greater portion of the property owned by the company.

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1910	$2,898,963	$1,798,898	$714,360	$1,084,568
1911	2,993,336	1,936,149	714,360	1,221,789
1912	3,195,377	1,197,547	756,304	2,149,856
1913	3,400,680	2,149,856	714,971	1,434,885

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

W. H. Bourn, Pres. J. S. Behan, Sec.
A. H. Payson, Vice-Pres. T. M. Edmunds, Asst. Sec.
S. P. Eastman, V.-P. & Gl. Mgr. Benj. Bangs Treas.

Standard Gas & Electric Company *Delaware*

The Standard Gas & Electric Company owns stocks, bonds and other securities of public utility corporations serving over 200 cities and towns, with a total population of approximately 1,656,000, situated in the states of Minnesota, Kentucky, Washington, Oklahoma, Alabama, Colorado, California, Arkansas, Iowa, North Dakota, Oregon, Illinois, Montana, Idaho and Wisconsin.

Subsidiary Companies.

Ark. V. Ry.Lt.& Pr.Co. Muskogee Gas & El. Co. *San Diego Consol. Gas
Enid Elec. & Gas Co. No.Ida.& Mont. Pr.Co. & Elec. Co.
Everett Gas Company. North. States Pr. Co. Southwestern Gen'l Gas
Ft. Smith Lt. & Tr. Co. Okla. Gas & El. Co. Co.
Louisville Gas & El. Co. Consumers Power Co. Tacoma Gas Company.
Miss. V. Gas & El. Co. Ottumwa Ry. & Lt. Co. *Western States Gas &
Mobile Electric Co. Olympia Gas Co. Electric Co.
*See information below.

Capitalization.

Stocks—	Authorized	Outstanding
$11,784,950 preferred (8%) Par $50.	$30,000,000	$11,784,950
Common	15,000,000	9,343,150
Funded Debt—		
Conv. S. F. 1926 bonds (6 per cent)	30,000,000	9,969,500
Coll. Trust Gold Notes (6 per cent)	3,000,000	2,446,000

Physical Property.

All of the public utilities in which Sandard Gas & Electric Company owns stocks, bonds and other securities have been thoroughly maintained in first-class physical condition. They operate under satisfactory franchises, serving communities which in the past have shown favorable increases in population, business importance and financial stability and offer every expectation of prosperous growth in the future. These companies operate in widely separated parts of the country and variously serve cities and towns of greatly diversified commercial and manufacturing interest.

Earnings.

Year	Gross Revenue	*Net Earnings
1911	$11,939,999	$5,727,794
1912	13,194,804	6,029,583
1913	14,060,442	6,316,448

*Net earnings are shown after deducting operating expenses and taxes.

Dividends.

	1910	1911	1912	1913	1914
Preferred (per cent)	3½[1]	7½[2]	8	8[3]	6[4]

[1] Initial dividend, 1¾ per cent, Sept. 15, 1910.
[2] Initial dividend, 2 per cent, Sept. 15, 1911.
[3] Dividend last 6 months 1913 and 1914, payable in scrip, due Sept, 1922, interest 6 per cent.
[4] Nine months.

Statistics.

	1913	1912	1911	1910
Electric Consumers	149,225	130,946	110,166	88,582
Gas Consumers	132,474	129,158	120,897	106,534
Water Consumers	2,290	3,145	2,702	1,626
Steam Consumers	883	826	835	755
Telephone Subscribers	2,660	2,473	2,138	2,385
Totals	287,532	266,548	236,738	199,882

	1913	1912	1911	1910
Kwt. Hour Output	339,977,796	291,366,636	251,728,523	210,841,243
Motors	18,784	15,890	13,069	9,758
H. P. Pr. in Motors	160,856	133,328	108,793	84,254
16 c. p. Eq.	2,727,970	2,441,758	2,082,932	1,658,576
City Arcs.	10,854	10,146	9,529	8,816
City Inc's.	12,761	9,390	6,996	5,478
Gas Output (cu. ft.)	9,122,718,102	9,824,253,465	9,316,453,927	8,108,788,459
St. Railway Receipts	$828,168.25	$801,963.25	$757,204.50	$704,639.01

Officers.

H. M. Byllesby, Pres. Herbert List, Asst. Seretary.
J. J. O'Brien, Vice-Pres. R. J. Graf, Treas. & Asst. Sec.
F. C. Gordon, Vice-Pres. Herbert List, Asst. Treasurer.
M. A. Morrison, Sec. & Asst. Treas.

WESTERN STATES GAS & ELECTRIC COMPANY

(Delaware)

(The Company owns entire capital stock of Western States Gas & Electric Co. of California.)

This Company operates gas works and steam electric power house with distributing systems in Eureka, hydro-electric power plant on Trinity River, near Junction City, and electric distributing systems in Arcata, Blue Lake, Fields Landing and Fortuna; electric distributing systems in Richmond; gas works and steam electric power house with distributing systems in Stockton, and electric distributing systems in Elk Grove, Florin, Galt, Lockeford, etc.; also hydro-electric power plant on American River near Placerville and electric distributing system in Placerville, and appurtenant transmission lines and other properties. Population served app. 78,750.

Capitalization.

Stocks	Authorized	Outstanding
Conv. cumulative, pref. (7%)	$10,000,000	$2,125,000
Common	5,000,000	3,503,000
Funded Debt—		
Bonds	10,000,000	4,737,500

Physical Property.

Hydro-electric developments include 4,500 K. W.; steam electric stations 5,250 K. W. 1,118,000 cu. ft. holders gas. Company at Stockton owns 16 gas wells and supplies mixture of artificial and natural gas. Richmond division purchases electric energy at wholesale from Pacific Gas & Electric Company and distributes through Richmond and vicinity.

Statistics.

	1910	1911	1912	1913
Miles of Pole line	563	635	811	923
Electric customers	6,573	10,622	12,893	15,019
Motor load h. p.	10,737	12,382	15,070	21,581
Miles gas mains	65	102	123	123
Gas customers	5,239	5,940	6,862	7,463

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1910	$750,696	$417,815	$143,429	$274,383
1911	866,399	498,067	209,982	288,085
1912	978,862	515,786	196,479	319,307
1913	1,085,647	488,764	259,149	229,615

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

H. M. Byllesby, President. R. J. Graf, Sec. & Treas.
F. C. Gordon, Vice-Pres. M. A. Morrison, Asst. S. & T.
Otto E. Osthoff, Vice-Pres. Herbert List, Asst. S. & T.

SAN DIEGO CONSOLIDATED GAS & ELECTRIC CO.

This Company operates a gas and electric plant in city of San Diego and serves both gas and electric energy to the following: San Diego, La Jolla, Pacific Beach, Old Town, Ocean Beach and Point Loma, Chula Vista, East San Diego, Encanto, La Mesa, Lemon Grove, Normal Heights and National City; electricity only to Bostonia, El Cajon, Foster, Imperial Beach and South San Diego, Lakeside and Lakeview, Nestor, Palm Station, Otay, Santee, San Ysidro and Helix, Del Mar; gas only to Coronado.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred	$ 500,000	None
Common	3,000,000	$2,715,000
All common owned by Standard Gas & Electric Co.		
Funded Debt—		
Bonds	$9,000,000	$4,199,000

Physical Property.

Gas—Holder capacity, 2,650,000 cu. ft.; annual output, 733,293,000 cu. ft. Miles of mains, 420; combined daily capacity water and oil gas plants, 4,375,000.

Electric—8,470 K. W. power station; 12,350 H. P. in engines and turbines; 5,494 H. P. in Babcock & Wilcox boilers; miles of pole line, 401; annual output, 18,931,466 K. W. H. Oil is used as fuel, and boilers are equipped with grates for burning lamp black, being a by-product of gas plant. During present year company will install additional 4,000 K. W. General Electric turbo-generating unit.

The charter of the Company for both gas and electric lighting is for a period of 50 years from March 29, 1897.

Statistics.

	1910	1911	1912	1913
Electric consumers	7,139	9,885	14,321	17,199
Gas consumers	10,155	13,061	17,864	20,348
City arcs	369	425	621	707
Motors	648	904	1,284	1,633
H. P. motors	2,835	5,024	8,117	13,678

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1910	$ 548,061	$277,314	$ 91,028	$186,286
1911	753,820	387,714	111,573	276,141
1912	1,019,471	511,767	165,140	346,627
1913	1,326,970	625,768	223,129	402,639

*Net earnings are shown after deducting operating expenses and taxes.

Dividends.

	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
Preferred	1¼	5	5	5	6½	7	7	None outstanding		
Common	...	..	..	..	5	6¼	7	7	8¾	10

Officers.

H. H. Jones, Pres. — A. H. Sweet, Vice-Pres.
H. M. Byllesby, Vice-Pres. — M. B. Fowler, Sec. & Treas.
F. C. Gordon, Vice-Pres. — R. J. Graf, Asst. T. & S.
Herbert List, Asst. T. & S.

TACOMA GAS COMPANY.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred 7% cumulative	$5,000,000	$ 750,000
Common	2,500,000	1,550,000
Funded Debt—		
Bonds	3,000,000	2,095,000

EVERETT GAS COMPANY.

Capitalization.

Stocks—	Authorized.	Outstanding.
Preferred 7% cumulative	$1,000,000	$ 310,000
Common	1,000,000	1,000,000
Funded Debt—		
Bonds	2,000,000	762,000

Standard Oil Co. of California, *San Francisco, Cal.*

The company operates extensive oil producing properties in Southern California, pipe lines, three refineries, can plant, a fleet of steamers and barges, and other equipment. It distributes and sells petroleum and its products; operating 135 stations in California, 27 in Oregon, 42 in Washington, 14 in Arizona, 7 in Nevada, 6 in Alaska and 1 in the Hawaiian Islands, 9 additional stations in course of construction.

Capitalization.

Stocks—	Authorized	Outstanding
Common	$100,000,000	$49,814,000

Physical Property.

The company owns extensive oil producing properties with an average daily production of 26,575 barrels, in the Kern River district and had recently acquired the holdings of the Murphy Oil Co. in the Fullerton field. It owns refineries at Richmond, El Segundo and Bakersfield, with daily capacity of 65,000, 20,000 and 25,000 barrels respectively, and a can manufacturing plant with daily capacity of 30,000 one and five-gallon cans. The company owns 386 miles of pipe lines, storage tanks and other equipment; a fleet of steamers as follows: coastwise and foreign, 9 steamers (American flag), aggregate capacity 275,000 barrels; 3 barges, aggregate capacity, 95,000 barrels, and 13 river and harbor boats with aggregate capacity of 35,350 barrels. On December 31, 1913, the total plant investment of the company was $50,268,456. Its inventories amounted to $21,724,390, which included 24,310,310 barrels of crude oil in storage; the balance being stocks of all products on hand in its various sales stations.

Dividends.

	'08	'09	'10	'11	'12	'13	'14
Per cent	10	46	2	0	10	10	10

Officers.

D. G. Scofield, Pres. — F. H. Hillman, Vice-Pres.
K. R. Kingsbury, Vice-Pres. — W. S. Miller, Vice-Pres.
W. S. Rheens, Vice-Pres. — R. J. Hanna, Treas.
H. M. Storey, Sec.

Union Oil Co. of California, *Los Angeles, Cal.*

The company is engaged in producing, transporting, manufacturing and marketing crude petroleum and its

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products throughout a large part of the Pacific Coast territory of the United States, Canada and South America.

Subsidiary Companies.

Mis. Tr. & Ref. Co. Union S. S. Co. Prod.Trans. Co.
Union Trans. Co. United S. S. Co. Union Tool Co.
Newlove Oil Co. Claremont Oil Co. So. Cal. I. & S. Co.
Outer Harbor Dock and Wharf Co.
S'ta Maria O. & G. Co.

Capitalization.

Stocks—	Authorized	Outstanding
Common	$50,000,000	$31,312,900
Bonds	20,000,000	8,348,000
Notes, collateral trust 6s	4,000,000	3,095,000

Physical Property.

Figures are as of June 30, 1914.

The company owns oil lands aggregating slightly more than 240,000 acres, but a small fraction of which is being utilized; 319 wells being in active production. These lands with leases and mineral rights owned by the company are valued at $22,831,758; the wells, development and equipment at $22,278,822. The company owns or controls more than 718 miles of pipe line extending from three tidewater ports to the four great oil-producing sections of California. Its storage system has a capacity of 13,043,450 barrels. The pipe lines and storage systems owned are valued at $4,338,721. The company owns a large fleet of vessels with a total carrying capacity of over 500,000 barrels, and others are in course of construction. The fleet, together with the tank cars owned by the company, are valued at $3,159,730. The company owns and operates four modern refineries and a compressor plant valued at $2,639,355, and its market stations are valued at $3,617,381.90. The company owns or controls 24 subsidiary companies, these holdings aggregate $13,213,179. The inventory of crude oil and refined stocks on hand totals $5,666,932.

Sources of Gross Revenue.

Year	Crude oil Sales	Refined oil Sales	Total
1910	$ 7,376,840	$3,218,049	$10,594,889
1911	10,109,563	5,746,310	15,855,873
1912	11,600,261	6,563,293	18,163,554
1913	13,494,240	6,449,201	19,943,441

Officers.

W. L. Stewart, Pres. E. W. Clark, V. P.
Alex. Sclater, V. P. Giles Kellogg, Sec.
John Garrigues, Treas.

UNION OIL CO.—Continued.

Earnings.

Year	Gross Profit	*Net Earnings	Interest	Balance
1910	$5,162,092	$3,625,133	$317,987	$3,307,146
1911	4,227,093	2,438,401	365,911	2,072,490
1912	5,329,131	3,511,338	671,599	2,839,738
1913	4,803,537	4,246,254	648,742	3,597,512

*Net earnings are shown after deducting operating expenses and taxes.

United Railroads of San Francisco,

San Francisco, Cal.

The company operates the entire street railway system of San Francisco, with the exception of the California Street Cable Railway Company and the Municipal Railway, the latter being owned by the city. The company also operates a suburban line to San Mateo, San Mateo County.

Capitalization.

*Stock—	Authorized	Outstanding
1st Preferred (7% cum.)	$ 5,000,000	$ 5,000,000
Preferred (4% cum.)	20,000,000	20,000,000
Common	18,800,000	17,948,600
Funded Debt—		
Bonds	†60,725,000	§36,474,000
Equip. trust cert.	‡700,000	440,000
5% gold notes	1,000,000	1,000,000
7% notes to Cal. Ry. & P. Co.	2,000,000	2,000,000

*All stock controlled by California Railway & Power Co.
†Retired and cancelled, $4,055,000.
‡Retired and cancelled, $260,000.
§Includes $151,000 held as sinking fund investments.

Physical Property.

The company controls and operates 260.02 miles of electric street and suburban railway in San Francisco and San Mateo counties, all of which is overhead trolley. It also owns and operates 14.70 miles of cable line on Castro, Powell, Sacramento, Clay, Washington and Jackson streets, San Francisco. Total 274.72 miles of single track. Cars —electric passenger 703, cable passenger 57, and work 76; total 836.

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1910	$7,862,796	$3,133,525	$2,042,410	$1,091,115
1911	8,150,763	3,443,792	2,095,213	1,348,579
1912	8,756,998	3,878,416	2,071,099	1,807,317
1913	8,723,464	3,559,768	2,036,518	1,523,250

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

J. W. Lilienthal, Pres. A. M. Dahler, Treas.
Chas. N. Black, V.-P. & Gl. Mgr. Geo. B. Willcutt, Sec. & Comp.
Thornwell Mullaly, Asst. to Pres.

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United Railways Investment Co., *Jersey City.*

The company is a holding company and does not operate any properties.

Subsidiary Companies.

Philadelphia Co.
California Ry. & Power Co.
Sierra & San Francisco Power Co.
Coast Valleys Gas & Electric Co.
United R. R.'s of San Francisco.
San Francisco Electric Railways.
The Railroads & Power Development Co.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred (5% cum.)	$25,000,000	$16,000,000
Dividend certificates	.....	1,462,500
Common	31,000,000	20,400,000
Funded Debt—		
Bonds	26,250,000	*18,960,000
Notes, 6 per cent sr., '08	3,500,000	1,100,000

*$752,000 Coll. Trust 5s held by trustee in sinking fund.

Physical Property.

The company owns $24,200,000 of the $39,043,000 common stock of the Philadelphia Co., located at Pittsburgh. It owns, directly or indirectly, all the preferred and common stocks of its California subsidiaries. For the purposes of this issue the operating California companies will be separately considered.

Earnings.

Year	Gross Revenue	*Net Earnings	Interest	Balance
1911	$2,136,536	$2,065,999	$1,225,172	$840,827
1912	2,260,250	2,181,182	1,191,537	989,645
1913	2,134,224	2,070,497	1,164,159	906,338

*Net earnings are shown after deducting operating expenses and taxes.

Officers.

Mason B. Starring, Pres.
Geo. W. Bacon, Vice-Pres.
Benj. S. Guinness, Treas.
W. J. Duane, Sec'y & Asst. Treas.
M. V. R. Weyant, Asst. Sec'y and Asst. Treas.
P. M. Hoskins, Auditor.

U. S. Smelting, Refining and Mining Co., *Boston.*

This company and its subsidiaries are engaged in mining copper, lead, gold and silver ores on their various properties in Utah, Nevada, California and Mexico. They operate smelters, refineries and reduction plants; a large lime quarry and coal mines in Utah; and are building a railroad to provide outlet for their product to the lines of the Denver & Rio Grande and the San Pedro route.

Subsidiary Companies.

United States Metals Refining Co.
United States Smelting Co.
Mammoth Copper Mining Co.
Gold Road Mines Co.
United States Mining Co.
Real del Monte y Pachuca Mines
Needles Mining and Smelting Co.
Richmond Eureka Mining Co.

Capitalization.

Stocks—	Authorized	Outstanding
Preferred (7% cum.)	$37,000,000	$24,313,725
Common	37,500,000	17,553,787
Notes, 4-year gold, due 1918	6,000,000	4,000,000
Utah Co. 6% coll. Tr. due 1917	10,000,000	10,000,000

Physical Property.

The company and subdiaries own a large group of mines, a lime quarry and smelter at Bingham, the Centennial Eureka Mine at East Tintic, the Mammoth Mine and Smelter at Kennet, Cal., a lead refinery at Chicago, and a controlling interest in the U. S. Metals refinery at Chrome, N. J. The company owns large coal properties in Utah aggregating 11,226 acres of which 7,526 acres are coal lands, which in 1913, produced 869,522 tons of coal. The company is now constructing 80 miles of railroad connecting these fields with the D. & R. G. and U. P. systems. The company owns the entire capital stock of its subsidiary companies with the exception of $1,031,324 par value.

Dividend Record.

April, 1906, to October, 1914—	
Preferred	$14,667,444.75
Common	6,362,189.18

Officers.

W. G. Sharp, Pres. & Ch'mn of Bd.
S. J. Jennings, Vice-Pres.
C. G. Rice, Vice-Pres.
Frederick Lyon, Vice-Pres.
F. Winthrop Batchelder, Sec'y & Treas.

Washington Water Power Co., *Spokane, Wash.*

The company operates a street railway system in Spokane, Wash., with connecting suburban and interurban lines. It owns and operates the electric light and power systems in 30 towns in Washington, including Spokane, and in 4 towns in Idaho. In addition it furnishes the power to systems not owned by it in 4 towns in Washington, and in 11 towns in Idaho.

Capitalization.

Stocks—	Authorized.	Outstanding.
Common	$20,000,000	$15,490,000
Funded Debt—		
Bonds	15,000,000	5,073,000
Notes	.....	2,274,000

Physical Property.

The company's railway system consists of 112.30 miles of track. Its city lines occupy 49.51 miles of streets. The

Attention is called to the announcement on page 11

company owns and operates 627 miles of transmission lines and the following hydro-electric plants: Spokane, 12,000 H. P.; Post Falls, Idaho, 15,000 H. P.; Little Falls, Wash., 27,000 H. P. All of its water power is on the Spokane River. It owns a 19,000 H. P. steam turbine plant at Spokane and is constructing an additional hydro-electric plant of 66,000 H. P. at Long Lake, Wash. The company's franchises for light and power business run to 1944 and the street railway franchises run for an average of 20 years.

Statistics.

Electric Light & Power System.
Comparative Statement.

	1907	1908	1909	1910	1911	1912	1913	Inc. over 1912
Max. Station Load, H. P.	22,400	26,800	30,200	34,873	37,155	38,312	40,521	6%
H. P. of motors in Spokane	6,863	8,506	9,880	15,692	16,224	17,970	18,609	4%
H. P. of mot. on trans. lines	10,569	14,176	16,652	17,824	18,735	20,992	25,244	20%
*Number of accounts	10,350	12,684	15,584	18,080	19,105	20,222	22,640	12%
*Number of meters in use	10,503	12,843	15,502	17,852	18,850	19,965	22,244	11%

*Not including meters and accounts in towns recently acquired.

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Interest.	Balance.
1910	$3,155,223	$1,476,683	$241,144	$1,235,539
1911	3,264,158	1,611,177	312,494	1,298,683
1912	3,170,246	1,567,892	276,648	1,291,244
1913	2,914,950†	1,623,277	259,219	1,363,958

†The apparent loss in gross due to change in methods of accounting.

*Net earnings are shown after deducting operating expenses and taxes.

Dividends.

1905 to 1910 inc. 7% 1911 to 1913 inc. 8%

Officers.

D. L. Huntington, Pres. Y. M. White, Treas.
H. L. Bleecker, V.-P. W. J. C. Wakefield, Ch. of Ex. Committee & V.-P.
C. S. MacCalla, V.-P. & G. Mgr.
A. F. S. Steele, Sec'y.

Weed Lumber Company, *San Francisco, Cal.*

The company is engaged in logging pine timber in Siskiyou County, Cal., and in the manufacture and sale of lumber, sashes and doors, boxes, etc.

Capitalization.

Stocks—	Authorized.	Outstanding.
Common	$2,000,000	$1,950,000
Funded Debt—		
Bonds	1,200,000	850,000

Physical Property.

The company owns 50,000 acres of timber land in Siskiyou county with 670,245,884 ft. of standing timber which they value at $1,675,615; railroad and logging equipment, and 3 mills at Weed, California. They also own logged off and ranch land and townsite properties aggregating $134,553.

Earnings.

	1913.	1912.	1911.
Gross earnings, all oper.	$501,506.43	$380,540.48	$322,853.04
Less int., taxes, misc. losses.	208,134.53	115,881.83	122,414.12
Net earn., exclus. of deprec.	$293,371.90	$264,658.65	$200,438.92
Less res. for plant deprec.	76,594.46	91,755.07	83,857.64
Net Earnings	$216,777.44	$172,903.58	$116,581.28

Officers.

G. X. Wendling, Pres. H. Fleishhacker, V.-P.
S. O. Johnson, V.-P. H. Nathan, Sec'y & Treas.

Yukon Gold Co., *New York, N. Y.*

The company is engaged in the mining of gold by dredging, hydraulic, and other methods of operation on land owned or leased in Alaska and California.

Capitalization.

Stocks—	Authorized.	Outstanding.
Common	$25,000,000	$17,500,000*

*Controlled by Guggenheim Exploration Co.

Physical Property.

The company owns and operates hydraulic properties in the Klondike region in Alaska, and dredging properties at Dawson and Iditarod, Alaska, and at Oroville and on the American River in California.

Earnings.

Year.	Gross Revenue.	*Net Earnings.	Dividend.	Balance.
1911	$1,462,042	$1,316,733	$1,312,500	$ 4,233
1912	2,721,419	1,072,592	1,050,000	22,592
1913	2,583,837	1,130,300	1,050,000	60,300

*Net earnings are shown after deducting operating expenses and taxes.

Sources of Gross Production.

	Dredges.	Hydraulics.	Miscel.
1911	$2,671,845	$434,382	.....
1912	3,346,026	629,043	.....
1913	4,347,111	256,491	$185,800

Officers.

S. R. Guggenheim, Pres. C. K. Lipman, Sec'y.
Dan'l Guggenheim, V.-P. Morris Guggenheim, Treas.
O. B. Perry, Gen'l Mgr.

Attention is called to the announcement on page 11

PUBLIC SERVICE
COMPANIES

PACIFIC GAS AND ELECTRIC COMPANY

445 SUTTER STREET

SAN FRANCISCO, CALIFORNIA

A Letter from the Treasurer to One of Our Stockholders

Dear Sir:

In your letter of August 28th, you express yourself as being very much interested in our offering of First Preferred Cumulative 6% Stock, and have asked me to give you an analysis of this security from an investor's standpoint.

As a purchaser of corporate securities, with many years of experience, you have undoubtedly trained yourself to look for certain fundamental requirements in deciding whether a security is worthy of your confidence. I believe, therefore, you will agree with me that every cautious investor should satisfy himself as to the following points which, to use your expression, "constitute the essential features of a sound and conservative investment."

1st. WELL DEMONSTRATED AND INCREASING EARNINGS WHICH SHOULD BE NOT ONLY SUFFICIENT TO PAY THE ANNUAL DIVIDENDS ON THE SECURITY, BUT SHOULD HAVE A MARGIN OF SAFETY, OVER AND ABOVE THE DIVIDEND REQUIREMENTS, TO INSURE THE REGULAR PAYMENT OF THE DIVIDENDS UNDER ALL CIRCUMSTANCES.

The annual reports of the Pacific Gas and Electric Company, particularly the report for the year 1913, have made the earnings of the Company since its organization in 1906 available to the public in detail, and, for the past three years, over the certificate of independent auditors, namely Messrs. Price, Waterhouse & Company, certified public accountants.

The following statement, which is a compilation for each of the past five years ended Sept. 30, 1914, will indicate to you very clearly that the earnings of the Company have not only grown steadily from year to year, but that in each one of these years the revenue available for dividends on the new preferred stock has been largely in excess of the required amount. Generally speaking, a bond is regarded as a safe investment if the issuing corporation can show that it is earning at least twice its bond interest. In fact, a great many bond issues which are regarded as high-class investments have a smaller margin of safety, with respect to earnings, than this. You can readily see from an examination of this earnings statement how much stronger even than this is the protection which our first preferred stock has with respect to earnings.

Year Ended September 30th	Gross Revenue	Net Revenue	Net Revenue After Bond Interest and Discount	Annual Dividends on New Preferred Stock	Balance Available for Dividends on Junior Stock Issues and for Depreciation or other Reserves
1910	14,122,173.46	6,110,917.48	3,128,876.84	750,000.00	2,378,876.84
1911	14,519,411.09	6,375,093.78	3,191,806.45	750,000.00	2,441,806.45
1912	14,718,797.16	6,361,581.78	2,813,574.31	750,000.00	2,063.574.31
1913	15,725,537.27	6,453,422.60	2,551.069.43	750,000.00	1,801,069.43
1914	17,066,906.77	8,093,271.59	4,083,570.04	750,000.00	3,333,570.04

2nd. INTRINSIC PROPERTY VALUE WELL IN EXCESS OF THE TOTAL OF THE SECURITY ISSUE.

Before authorizing security issues, the Railroad Commission of the State of California requires proof to be submitted to it of the intrinsic value of the property back of the security for the issuance of which authority is sought by the utility.

The Commission, as you may know, not only has authorized the issuance of this stock, but took occasion to commend our plan of junior financing as being worthy of emulation by other utilities. For your information I may add that the appraised value of our property is substantially in excess of the full liquidation value of $100 per share of this new stock.

3rd. FRANCHISES EXTENDING WELL BEYOND THE MATURITY OF THE SECURITY ISSUE.

The following paragraph from our 1913 annual report will show you that for all practical purposes the franchise question may be regarded as non-existent with respect to this Company:

"By its unanimous decision of April 6, 1914, inthe case of Russell v. Sebastian, in the argument of which counsel for this Company participated, the Supreme Court of the United States established the fact, beyond any further question, that the franchises secured under the authority of the State Constitution prior to its amendment on Ocober 10, 1911, under which this Company is supplying gas and electric light and water in the large number of municipalities served by it, are vested property rights of perpetual duration and include the right of making all necessary extensions within such municipalities upon the terms of the original grant. By a general law of the State, no franchise of any description may now be granted except upon condition that the purchaser pay at least two per cent of the gross annual receipts derived from its exercise. In the case of cities governed by freeholders' charters, the conditions upon which franchises are granted, are in general more onerous than those prescribed by this general law of the State. The importance of this decision will, therefore, be more fully appreciated when it is considered that the above mentioned franchises of this Company are not only without time limit, but are also not subject to any specific rental, charge or burden of any kind.

4th. EARNINGS DERIVED FROM A GROWING AND DIVERSIFIED BUSINESS AND WHICH WILL CONSEQUENTLY NOT BE MATERIALLY AFFECTED BY DEPRESSION IN ANY ONE INDUSTRY.

The following statement will show you the diversified character of the Company's business:

DEPRIVATION OF GROSS REVENUES PAST SEVEN FISCAL YEARS.

SOURCES OF GROSS REVENUE						PERCENTAGE OF TOTAL GROSS REVENUE FROM				
Year	Electricity	Gas	Railway	All Other	Total	Electricity	Gas	Railway	All Other	Total
1907	$6,316,629	$4,086,372	$431,800	$507,339	$11,342,140	.56	.36	.04	.04	100
1908	7,059,088	4,494,945	414,326	688,946	12,657,305	.56	.36	.03	.05	100
1909	7,678,665	4,860,034	452,396	500,193	13,491,288	.57	.36	.03	.04	100
1910	7,899,224	5,202,284	509,152	433,936	14,044,596	.56	.37	.04	.03	100
1911	7,823,903	5,735,219	533,520	511,967	14,604,609	.54	.39	.04	.03	100
1912	7,672,570	5,805,865	547,187	719,029	14,744,651	.52	.39	.04	.05	100
1913	8,230,782	6,547,595	572,913	851,047	16,202,237	.51	.40	.04	.05	100
Gain 6 years	$1,914,153	$2,461,223	$141,113	$343,708	$4,860,197					

There has been a very satisfactory growth in each line of activity, and at no time has it been a case of having to rely for the payment of charges and dividends upon one department to offset deficiency in another, although from the standpoint of the security purchaser the ability to maintain the stability of revenues in this way is a factor of much importance. During the nine months ended Sept. 30, 1914, our electric business increased $400,919 and our gas business increased $423,991. I merely mention this to lend point to the statement that while the possibilities of the future development of the electrical industry are universally recognized, no such general recognition has obtained with respect to the gas industry. In my opinion, which is supported not only by the foregoing figures, but by daily observation, the possibilities of the growth of the gas business are fully as great as in the electrical department. This is largely due to the increasing use of gas for cooking and industrial purposes, but more particularly to its use for heating of homes, apartment houses and other buildings in their entirety. Two things are responsible for this. One is our moderate California climate, which brings this method of heating within economical limits, and the other is the development of convenient and economical gas heating systems and devices. It may be of interest to you to learn that a large number of the buildings on the Exposition grounds are being heated, or will be heated, entirely by means of gas. As already stated, our climate is largely responsible for this, and where such a system in colder localities would be a luxury which very few could afford, it is within the reach of people with moderate means in California.

5th. A GROWING TERRITORY FOR THE COMPANY'S BUSINESS FIELD AND ONE WHICH IS SUFFICIENTLY EXTENDED AND DIVERSIFIED SO THAT EARNINGS WILL NOT BE MATERIALLY AFFECTED BY DEPRESSION OR BY SOME CATASTROPHE IN ANY PARTICULAR CITY OR OTHER LOCALITY.

The Pacific Gas and Electric Company operates in a territory approximately 37,000 square miles, and in this territory serves a very large number of cities and towns, as shown in the following table:

SERVICE FURNISHED	NUMBER OF CITIES AND TOWNS SERVED BY THE COMPANY			TOTAL POPULATION
	Directly	Indirectly	Total	
Electricity	152	62	214	1,221,123
Gas	49	2	51	1,124,893
Water (Domestic)	14	14	28	58,905
Railway	1	..	1	75,602

That the business field of this Company is one which has in the past grown steadily in population and in the development of new industries is known to you not only from personal observation of central and northern California, but is also attested by the growth in our gross revenues from year to year and by the large numbers of consumers added to our system.

In the seven years from 1906 to 1913, our business increased $7,255,175, or at the annual rate of $1,036,453.

In the last fiscal year the increase was $1,457,686, and in the nine months ended Sept. 30, 1914, it was $876,297.

In the last seven years (ended Sept. 30th) the number of our consumers has grown from 172,938 to 368,498, an increase of 195,560, or an average annual increase of 27,937 customers. During the last of these years the growth was close to 30,000.

6th. SAFEGUARDS TO INSURE ADDITIONAL ISSUANCE OF SECURITIES ONLY FOR PURPOSES THAT WILL ADD TO THE VALUE AND EARNING CAPACITY OF THE PROPERTY.

One of the things that has given investors confidence in bonds as an investment has been the vigilance of banking houses handling bond issues in properly safeguarding future issues. What the bankers have done in the past for bonds in this respect is now being done by the Railroad Commission. Under the Public Utilities Act of California, issues of this First Preferred Stock can be made only with the authority of the Railroad Commission for acquisitions, extensions, betterments and the refunding of existing obligations. The Commission also fixes the price at which this stock may be sold, and not only requires information to be presented to it as to the purposes for which the money realized from the sale of this stock will be used, but also requires monthly reports to be rendered to it showing in detail for what purposes the money has been expended. This insures to the investor the continuance of a safe and conservative relation of property values to any additional issues of preferred stock which may be put out.

Trusting that the foreging will satisfactorily answer your inquiry, I am,

Very sincerely yours,

A. F. HOCKENBEAMER,
Second Vice-President and Treasurer.

Adv.

Attention is called to the announcement on page 11

Pacific Light and Power Corporation

Los Angeles, California

An H. E. Huntington Property

Supplies Electricity for Power, Light and Heat in Southern California

SECURITIES

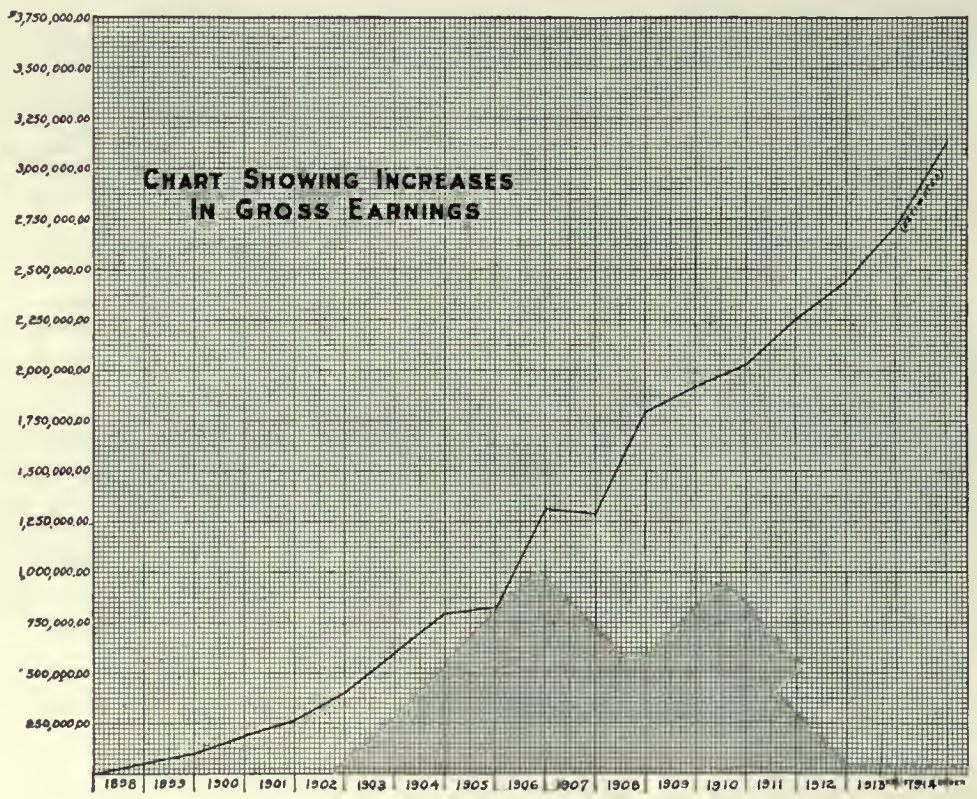
Stocks	$23,591,500
Bonds	20,508,000

OPERATES

8 Hydro-Electric Plants of 99,631 H. P.
3 Steam Plants of 55,919 H. P.
25 Substations.
1450 Miles of Transmission Line.
1971 Miles of Distributing System.
58 Miles of Railroad.

SUPPLIES CURRENT FOR

36 Cities and Towns.
750,000 Population.
945 Miles of Electric Railway.
35,000 H. P. in Motors.
500,000 Lamps, 16 c. p. Equivalent.



Installed Capacity . . . . 155,000 H. P.
Undeveloped Water Power . 325,000 H. P.

Attention is called to the announcement on page 11

Los Angeles Railway Corporation

Los Angeles, California

An H. E. Huntington Property

Street Railway System operating in and about Los Angeles, Cal.

SECURITIES

Stocks	- -	$20,000,000
Bonds	- -	20,000,000

Operates

383 Miles of Track
874 Modern Street Cars
10 Sub Stations
Power furnished by the Pacific Light & Power Corporation

Serves

The City of Los Angeles and five other Towns with a population of 516,000. Average increase of population now 15%.

	1900	1913
Gross Income, -	$835,627.35	$7,005,433.26
Miles Road Operated, -	74.85	383
Cars Operated, - - -	110	874
Passenger Carried,	17,874,308	145,105,239

Attention is called to the announcement on page 11

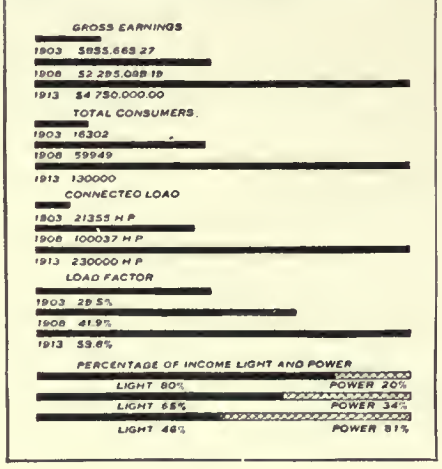
Southern California Edison Co

JOHN B. MILLER, PRESIDENT.

Upon Southern California it may be truly said the eyes of America are focused. The heart of this great domain is extensively served with electric energy for light, heat and power. Among the many reasons why this region is attracting world-wide attention are the wonderfully salubrious climate, the great agricultural and mineral wealth of the territory and the possibilities for the development of an empire where a few years ago there existed only what seemed to be arid deserts and waste plains. Added to this, Southern California has attracted a class of men who by their ability, perseverance and foresight have been able to understandingly grasp the conditions and spread the news to the world beyond the confines of the state of what has been done and what may yet be done in the way of development.

The census figures demonstrate that California is the second State in the Union in kilowatt rating of stations and in kilowatt hour output. It is the third state in the Union in aggregate income and twelfth State in the Union as regards population. The Southern California Edison Company is the second largest electric company on the Pacific Coast, and the seventh largest electric company in the United States in relation to gross earnings. The company's lines cover seven counties embracing an area of approximately 45,000 square miles, which contains a population of 1,030,000. The company has in operation hydraulic and steam generating plants with a total capacity of 119,800 horse-power, and has hydraulic plants under construction of a total capacity of 116,000 horse-power, making a grand total of 235,800 horse-power. Southern California Edison electric service is supplied in THE CITY OF LOS ANGELES and about one hundred cities and towns and the intervening rural communities. ¶ **The Company's General Offices are located in the Edison Building, Los Angeles, California.**

THE FOLLOWING TABULATION GIVES A GRAPHIC IDEA OF THE EXTRAORDINARY GROWTH OF THE COMPANY'S BUSINESS.



Attention is called to the announcement on page 11

Puget Sound Traction, Light & Power Company

¶ Serves over 425,000 population in the Puget Sound District with Electric Power, Light and Transportation.

¶ 74,000 horsepower developed at four hydro-electric plants, ultimate development 175,000 horsepower. Steam power developed, 34,900 horsepower.

¶ Seattle, Tacoma, Everett, Bellingham and surrounding territory offer strong inducements to manufacturers to locate factories.

¶ This company will supply complete information as to low power rates, raw materials, factory sites, transportation facilities and market for product.

Puget Sound Traction, Light & Power Company

SEATTLE, WASHINGTON

SNOQUALMIE FALLS

Attention is called to the announcement on page 11

The Portland Railway, Light & Power Company—Portland, Oregon

Served More Customers, on the Basis of Population, on January 1st, 1914, Than Any Public Utility in the Country Operating in a Large City

Its light and power customers totaled 42,063, an increase of more than 242 per cent compared with the number served on January 1st, 1908.

With 306 miles of track electrically operated and 90,000 developed horsepower, the PORTLAND RAILWAY, LIGHT & POWER COMPANY serves very completely the transportation and electric light and power requirements of the city of Portland and its prosperous surrounding sections. With the exception of three interurban lines, controlled by the Southern Pacific and the Northern Pacific Railroad Companies, the PORTLAND RAILWAY, LIGHT & POWER COMPANY operates all the street railways in Portland and vicinity, including interurban lines to Oregon City, Troutdale, Cazadero and Bull Run, Oregon, and in conjunction with the company's ferry on the Columbia river, to Vancouver, Washington. It does most of the electric light and power business in Portland; all of the electric light and power business in Oregon City, Salem and many other communities in the state of Oregon and in Vancouver, Washington. It operates the gas plant in Salem. Altogether, the company serves with light and power 26 cities and towns, which, including others supplied with interurban railway service, have a total population estimated at 305,000.

Power is sold to the three interurban lines above mentioned and also to the companies operating the street railways of Salem and Vancouver. At Willamette Falls, Oregon City, where the water power is owned by the company, direct water power is furnished to several large pulp and paper mills.

In 1913 the PORTLAND RAILWAY, LIGHT & POWER COMPANY bought the Yamhill Electric Company, serving a population of 5,000 at Newberg, Carlton, Lafayette, St. Paul and other communities in the Willamette Valley, and selling wholesale power to the Tualatin Electric Company. The Yamhill Electric Company has long-term franchises and municipal contracts in all the communities served. The company also obtained control of the Willamette Valley Southern Railway Company, which is constructing a standard gauge electric line on private right-of-way (except for a few blocks in Oregon City) from Oregon City to Molalla and Mt. Angel, a distance of 32 miles. The new line connects at Oregon City with the company's interurban service to Portland. The region tapped is one of the richest farming sections in Oregon, and besides passenger traffic, a large freight business will be developed, consisting mainly of hauling lumber.

The company's street railway franchises in Portland, expiring in 1932, contain valuable preferential rights covering subsequent franchises. No time limit is specified in the principal light and power franchises and under a recent decision of the United States Supreme Court, a similar franchise was held to be perpetual. The power plants, carhouses, shops and other real estate, high tension transmission lines and a large part of the interurban lines are owned in fee and are, therefore, not subject to franchise expiration.

There are ten generating plants, with 90,000 horsepower developed. Five of these are hydro-electric plants and five are steam stations. The company has at least an equal amount of water rights in reserve. Approximately 83% of all the electric energy required in 1913 was generated by water power. In addition to these power plants and 22 sub-stations, the PORTLAND RAILWAY, LIGHT & POWER COMPANY owns 633 passenger cars, 522 cars and 12 locomotives for freight service; a commodious building for use of the light and power development; car shops, four carhouses, a nine-story building in the center of the business district, occupied by its offices; the only amusement park near the city of Portland; large tracts of land fronting for about four miles on the east side of the Willamette river, near the business center and valuable for terminal purposes, and considerable real estate in various parts of the city.

The company's properties and equipment are in excellent physical condition, of the most modern construction and as well maintained as any similar system in the United States. Through application of the principles of scientific efficiency, expenses of operation have, without impairing the service, been kept at a low percentage despite higher wages and the increased cost of materials.

Portland is one of the wealthiest cities of its size in the United States and the greatest manufacturing city in the Pacific Northwest. Its banks have deposits aggregating $71,000,000; it has an assessed valuation of $300,000,000; 48,000 telephones and 43,329 dwelling houses. Its bank clearances for 1913 exceeded $600,000,000; its postal receipts, $1,200,000; value of building permits for the year, $13,400,000. These figures have few equals in the United States, when population is taken as the basis for comparison.

Portland is the greatest lumber shipping port in the world, many of the largest mills in the country being located there. The available forest wealth is practically inexhaustible. Its harbor is one of the largest fresh water basins in the world and can accommodate steamships drawing 25½ feet of water. Steamers leave its wharves for China, Japan, the Philippines, Hawaii, Alaska and various Pacific coast ports. It has a large export business and is an important railroad center, being served by four transcontinental railways—the Union Pacific, Southern Pacific, Northern Pacific and Great Northern. Through the Columbia River valley it affords the only water grade railroad outlet to the Pacific coast for what is known as the Great Inland Empire of 250,000 square miles, comprising Eastern Oregon, Eastern Washington, Idaho and Western Montana.

Completion of the Panama Canal means the opening of a new gateway for commerce, one result of which will undoubtedly be a stimulus to business—foreign and domestic—that will manifest itself in improved general conditions throughout the Pacific coast. Development of Alaska and the inauguration of a new steamship line from Portland to that country will have its beneficial effects and the combination generally is being looked upon as among the most important factors in the future development of Portland and its surrounding territory, as well as other large cities on the Pacific coast.

The Portland Railway, Light & Power Company

Is Controlled and Managed by E. W. CLARK & COMPANY, Philadelphia, Pa.

Attention is called to the announcement on page 11

Attention is called to the announcement on page 11

Pacific Power & Light Company

The Columbia, Walla Walla and Yakima Valleys, in which the Pacific Power & Light Company operates, are among the richest on the Pacific Coast.

The territory affords excellent opportunities for all industries depending for success upon raw materials, transportation facilities and low-cost power.

Pacific Power & Light Company has large electric power developments and furnishes power for industrial, irrigation and miscellaneous purposes at low cost.

This Company will supply complete information regarding natural resources, developed industries, transportation facilities and power rates.

Head Office, Portland, Oregon

Attention is called to the announcement on page 11

LOS ANGELES GAS AND ELECTRIC CORPORATION

April 1, 1914

CAPITALIZATION

	Outstanding
CAPITAL STOCK:	
First Preferred 6% Cumulative	None
Second Preferred 6% Cumulative	None
Common	$10,000,000
BONDED DEBT (Less Bonds in Sinking Funds):	
First and Refunding Mortgage 5% Bonds (Authorized $15,000,000)	$4,659,000
Underlying Bonds (Closed mortgages)	3,236,000
Total Bonds Outstanding	$7,895,000

Bond Trustees:
Union Trust Company of San Francisco,
Harris Trust and Savings Bank, Chicago, Ill.

EARNINGS AND EXPENSES

	Year Ending Dec. 31, 1912	Year Ending Dec. 31, 1913
Gross earnings	$4,178,176	$4,527,164
Operating Expenses and Taxes	2,335,212	2,589,594
Net Earnings	$1,842,964	$1,937,570
Annual Bond Interest Charge	396,405	400,943
Surplus	$1,446,559	$1,536,627

DEPRECIATION—SINKING FUND

The allowance for depreciation has amounted to $4,676,074 since May 1, 1904.

The Corporation is required to make annual sinking fund payments, which began July 1, 1910, equal to 2% of the total amount of bonds outstanding. Up to the present time $755,000 Underlying and Corporation Refunding Mortgage 5% Bonds have been cancelled or are held alive by their respective sinking funds.

PROPERTY AND BUSINESS FIELD

The Corporation has a thoroughly modern equipment for the manufacture and distribution of gas in Los Angeles, Pasadena, South Pasadena, Alhambra, San Gabriel, San Marino, Watts, Eagle Rock, Huntington Park, Inglewood and other suburban districts, aggregating a population of about 570,000, in which territory it controls about 85% of the gas business. It carries on an electric light and power business in the City of Los Angeles, a field served also by the Southern California Edison Company and the Pacific Light and Power Corporation. The physical property of the Corporation, without any allowance for franchise or good will, is conservatively valued at over $20,400,000, or over two and one-half times the $7,895,000 of outstanding bonds.

The following details as of Apr. 1, 1914, may be of interest:

Rated capacity of gas generating plant per 24 hours	31,140,000 cu. ft.
Holder capacity	15,000,000 " "
Miles of gas mains	1,239
Number of gas meters	123,621
Builders' rated capacity of electric plant	25,650 H. P.
Miles of electric overhead main wire	2,388
Miles of electric underground conduits	21
Number of electric meters	36,794
Total electric connected load	65,717 H. P.

MANAGEMENT

The principal officers of the Corporation are as follows:

President & General Manager, W. B. Cline.
Vice-President, Wm. Baurhyte.
Second Vice-President, C. P. Houghton.
Third Vice-President, C. S. Vance.
Secretary & Treasurer, R. M. Adams.
General Counsel, Wm. A. Cheney.

Attention is called to the announcement on page 11

SERVICE

Associated Savings Banks of San Francisco A Community Asset

SAFETY

A GREAT banking centre is the product of two elements: a productive land and a thrifty people. Where money is made and saved, there will be found the strongest banks to direct its proper use.

* * *

SAN FRANCISCO as the banking centre of the West had its beginning in the days following the discovery of gold in California, when the city was only an isolated collection of shacks on the edge of a wilderness. At that time a transcontinental railway was scarcely dreamed of, and the only inhabitants were the pioneers, who had traveled across the plains or by ship "around the Horn."

Even with the golden stream from the mines, capital was urgently needed and progress at first was slow. But the settlers worked and saved, until soon they were able to establish through sound banks a credit that is independent of the rest of the world.

With their own credit, secured by their own savings, they have built their city, not once, but *twice,* in the face of adversity.

* * *

THE test of the savings banks of San Francisco as an unfailing community asset came when the great fire of 1906 wiped out property values amounting to $400,000,000—the accumulated wealth of two generations. How the banks passed though that crisis without loss to a single depositor must be convincing proof of sound and able management.

The greater part of the loss caused by the fire fell upon real estate; that is, upon the buildings that stood in the heart of the most valuable retail, commercial and residence districts. At the time of the fire, the banks had fifty per cent of their total assets loaned on the property that was destroyed. All that remained were blackened ruins and tottering walls.

* * *

DEPOSITORS had to be protected. So, too, the borrowers, who needed additional money to rebuild at once. The banks came forward with their strong reserves and convertible securities, and with the aid of the insurance, turned these elements of capital into a credit that has been used to build a finer and costlier city than before.

By reason of their demonstration of strength in this emergency, the banks have grown larger and more secure in the years that have passed, and better able to meet the needs of the growing community which they serve.

A more convincing record has never been made by the banks of any city in the world.

* * *

AT the close of 1905, the year before the fire, the total resources of the savings banks of San Francisco amounted to $177,000,000. Since then they have increased nearly one-fifth, in spite of the losses sustained through the destruction of bank property—losses which were borne by the banks and not by their depositors.

Loans on real estate, meaning the money loaned for the improvement of property, have grown from $97,000,000 to $125,000,000.

Consolidated Statement Showing Condition of Eleven Institutions Composing the Associated Savings Banks of San Francisco on June 30, 1914.

RESOURCES	
Loans	$133,896,748
Bonds and other securities	53,131,602
Bank premises	6,014,412
Other real estate	2,296,890
Due from reserve banks	6,027,934
Cash on hand	10,134,588
Other Assets	1,135,878
Total	$212,698,052
LIABILITIES	
Capital	$ 7,180,000
Surplus	8,475,819
Undivided Profits	661,799
Other Profits	984,959
Due to other banks	478,025
Individual deposits subject to check	11,863,868
Savings deposits	180,436,687
Deposits of public moneys	1,660,506
Other Liabilities	956,391
Total	$212,698,052

Table Showing Strength of Associated Savings Banks of San Francisco with Deposits, Capital and Surplus, June 30, 1914.

Bank	Deposits	Capital and Surplus
German Savings & Loan Society	$55,798,917	$2,775,000
Hibernia Savings & Loan Society	55,122,574	3,694,819
Savings Union Bank & Trust Company	33,739,800	3,620,000
Bank of Italy	15,341,205	1,397,000
Mutual Savings Bank	8,723,286	925,000
Humboldt Savings Bank	8,870,497	1,000,000
French American Bank of Savings	6,155,936	944,000
Italian American Bank	4,949,519	940,000
Security Savings Bank	3,690,985	635,000
Columbus Savings & Loan Society	2,351,838	240,000
Mission Savings Bank	1,882,372	205,000

Individual deposits, as shown by the last reports, have reached close to $200,000,000, a growth of nearly 25 per cent.

* * *

FURTHER evidence that the savings banks of San Francisco possess the quality of safety requisite to obtain the confidence of the community is found in the California Banking Laws, which afford full and complete protection to every interest involved in bank management. The State Superintendent of Banks, in his published report dated October 31, 1913, discusses the character of these Laws as follows:

"Under authority of the amended laws, state supervised banks, which necessarily are the support of private credit and the basis of industrial progress, are given as wide a range of activity as is consistent with absolute safety of deposits. The amended laws are designed with the primary objective that the safety of bank deposits must not be imperiled. Stability of investments and the possession of cash resources sufficient for the emergencies of business have been the guiding posts, in the amended act, where regulation ends and freedom of honest action for the banker begins."

* * *

IN point of size and strength, the institutions composing the Associated Savings Banks of San Francisco rival those of any community in America. The per capita deposits are the highest in the country, for the people believe in these banks and are glad to assume with them reciprocal relations that make towards the improvement and development of the city and state.

It is worthy of mention that the savings Banks, as heavy investors in the bonds of California enterprises, are an important factor in the commercial growth of the state.

* * *

KNOWLEDGE of these facts is important to the settler, the investor and the prospective visitor to San Francisco.

Sound banks mean that worthy enterprises will not lack for financial support. When they are of highest service to the community, as in San Francisco, they establish a beneficial union between capital and credit that opens the way to increased prosperity and wealth.

* * *

THE eleven banks composing the Associated Savings Banks of San Francisco exhibit a spirit of progress that constantly makes for the improvement of their service and facilities. The extraordinary growth of the past few years has been shared by all, and under their present able management all will continue to increase in size and strength.

Those operating strictly as savings banks are the Columbus Savings and Loan Society, founded in 1893; the Hibernia Savings and Loan Society, founded in 1864; the Mission Savings Bank, founded in 1906; the Mutual Savings Bank, founded in 1889; and the Security Savings Bank, which was organized in 1871.

The banks transacting a departmental business are the Bank of Italy, organized in 1904, commercial and savings; French American Bank of Savings, organized in 1860, commercial and savings; German Savings and Loan Society, founded in 1868, commercial and savings; Humboldt Savings Bank, founded in 1869, commercial and savings; Italian-American Bank, founded in 1899, commercial and savings; and the Savings Union Bank and Trust Company, founded in 1862, which transacts a full departmental business, including commercial, savings and trust departments.

Modern fireproof safe deposit vaults for the use of the public are maintained by the Savings Union Bank and Trust Company, the Bank of Italy, the Columbus Savings and Loan Society, the French American Bank of Savings and the Humboldt Savings Bank.

Adv.

BANK & TRUST CO.
SECTION

The Bank of California

National Association

San Francisco, California

Founded in 1864

Having Branches at

Portland, Oregon	Seattle, Washington
Tacoma, Washington	Virginia City, Nevada

Capital paid in Gold Coin	$8,500,000.00
Surplus	6,500,000.00
Undivided Profits, September 12, 1914 .	1,795,664.29

The Bank issues Merchandise and Travelers' Letters of Credit, available throughout the world and transacts legitimate banking of every nature.

Correspondence and accounts invited

Attention is called to the announcement on page 11

STATEMENTS

of

Banks & Trust Companies of the Pacific Coast

These figures are compiled from the latest reports to the publishers.

Hundreds Omitted Throughout.

CALIFORNIA—	Capital	Surp. and Profits	Gross Deposits	Gross Resources
San Francisco—				
American National Bank	$1,000	$ 450	$ 5,050	$ 8,000
Anglo & London-Paris National Bank	4,000	1,809	30,995	41,467
Anglo California Trust Co.	1,500	400	8,862	10,862
Bank of California, N. A.	8,500	8,295	38,930	63,933
Bank of Italy	1,250	340	15,379	17,171
Canton Bank	123	33	694	902
Crocker National Bank	2,000	3,263	20,615	29,120
Donohue-Kelly Banking Co.	650	200	1,706	2,670
First National Bank	3,000	1,932	14,725	20,935
First Federal Trust Co.	1,500	316	4,062	6,379
Fugazi Banca Populari	400	93	4,893	5,484
International Banking Corp.	3,250	4,066	20,532	41,359
Italian-American Bank	750	217	5,052	6,119
Marine Trust & Savings Bank.	125	95	850	1,050
Mercantile Nat'l Bank of S. F.	2,000	1,148	10,419	15,936
Mercantile Trust Co.	1,000	348	.....	1,358
Merchants National Bank	1,500	279	4,700	7,730
Mission Bank	200	91	1,320	1,757
Portuguese-American Bank	325	58	1,342	1,760
Sav. Union Bank & Trust Co.	1,500	2,469	33,373	37,451
Seaboard National Bank	500	213	1,585	2,798
Union Trust Co. of S. F.	1,200	1,718	20,058	23,217
Wells Fargo Nevada National	6,000	5,148	29,070	48,941
Columbus Savings & Loan	130	157	2,328	2,650
French-American Bank	750	350	6,500	7,600
German Savings & Loan Soc.	1,200	1,857	55,799	58,857
Hibernian Savings & Loan Soc.		3,889	53,466	57,536
Humboldt Savings Bank	600	400	6,641	7,881
Mission Savings Bank	200	15	1,875	2,111
Mutual Savings Bank	500	475	8,400	9,575
Security Savings Bank	500	423	3,580	4,564
Western Metropolis Sav. Bank	100	1	75	176
Alameda—				
Alameda National Bank	100	45	506	760
Alameda Salvings Bank	236	146	2,537	2,918
Citizens National Bank	100	17	421	537
Citizens Savings Bank	50	28	656	734
Bakersfield—				
First Bank of Kern	100	33	616	750
First National Bank	150	175	1,276	1,814
National Bank of Bakersfield	100	5	275	455
Producers Savings Bank	100	86	982	1,168
Security Trust Co.	400	136	1,980	2,557
Berkeley—				
Berkeley National Bank	250	65	723	1,238
First National Bank	300	128	2,510	3,122
Homestead Savings Bank	90	14	368	472
Berkeley Bank of Savings	400	288	4,053	4,955
South Berkeley Bank	50	35	491	583
University Savings Bank	100	48	531	690
West Berkeley Bank	55	7	316	379
Chico—				
Bank of Chico	100	30	500	630
Butte County National Bank	250	250	1,000	1,695
Butte County Savings Bank	100	19	682	802
*Peoples Savings & Com'l Bk.	65	.....	94	168
First National Bank	50	30	825	950
*Opened July, 1914.				
Colusa				
Colusa County Bank	500	350	1,110	2,250
First National Bank	75	5	148	283
First Savings Bank	35	3	148	186
Eureka—				
Bank of Eureka	200	100	875	1,187
First National Bank	200	162	1,268	1,830

Hundreds Omitted Throughout.

CALIFORNIA—(*Cont'd*)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Eureka— (*Cont'd*)				
Home Savings Bank	100	65	1,200	1,350
Humboldt National Bank	200	80	600	900
Savings Bank of Humboldt Co.	100	140	1,610	1,855
Fresno—				
Bank of Central California	200	125	581	906
Farmers National Bank	300	350	2,000	3,000
First National Bank	500	445	2,744	4,039
Fresno National Bank	200	361	1,051	1,863
Fresno Savings Bank	67	5	535	600
Industrial Bank	30	.....	34	64
Peoples Savings Bank	100	151	1,906	2,198
Union National Bank	150	124	950	1,389
Grass Valley—				
Nevada County Bank	150	14	1,197	1,361
Hanford—				
Farmers & Merchants Nat'l Bk.	100	66	745	961
First National Bank	100	225	1,001	1,441
Hanford National Bank	100	34	170	347
Peoples Savings Bank	25	46	74	149
The Old Bank	50	55	545	726
Hanford Savings Bank	50	30	242	322
Hollister—				
Bank of Hollister	250	327	727	1,362
First National Bank	100	155	320	531
Hollister Savings Bank	25	35	370	435
Savings & Loan Bank	50	136	634	825
Long Beach—				
City National Bank	100	28	790	1,000
Exchange National Bank	100	65	1,001	1,267
Farmers & Merchants Bank	120	38	1,087	1,246
First National Bank	200	100	1,150	1,500
National Bank of Long Beach.	150	138	1,489	1,924
Long Beach Sav. & Trust Co.	250	114	1,761	2,146
Los Angeles—				
Citizens National Bank	1,500	754	9,700	13,700
Commercial National Bank	300	180	2,430	3,479
Eagle Rock Bank	25	2	56	95
Farmers & Merchants Nat'l Bk.	1,500	2,136	13,294	19,001
First National Bank	1,500	2,543	18,962	25,401
Highland Park Bank	25	16	260	305
Merchants National Bank	1,000	646	6,937	9,292
National Bank of California	500	216	4,786	6,674
Security National Bank	300	236	2,863	3,515
Traders Bank	250	20	1,136	1,423
United States National Bank	200	106	1,243	1,782
California Savings Bank	300	87	2,659	3,046
Citizens Trust & Savings Bank	500	157	3,013	3,679
German-American Trust & Savings Bank	1,000	1,377	18,676	21,053
Hellman Commercial Trust & Savings Bank	750	295	5,175	6,335
Hibernian Savings Bank	325	45	3,010	3,379
Home Savings Bank	1,000	117	6,295	7,462
International Savings & Exchange Bank	300	69	2,746	3,164
Los Angeles Title & Trust Co.	600	40	198	838
Los Angeles Trust & Sav. Bk.	1,500	1,539	17,113	20,234
Security Trust & Savings Bk.	1,800	1,868	38,500	42,800
Title Guarantee & Trust Co.	500	370	200	1,070
Martinez—				
Bank of Martinez	100	121	852	1,086
First National Bank	50	12	303	415
Marysville—				
Decker, Jewett & Co. Bank	150	65	513	728
Northern California Bank of Savings	130	64	1,876	2,070

CALIFORNIA—(Cont'd) Marysville—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Rideout Bank	250	339	1,716	2,396
Merced—				
Commercial Savings Bank	100	43	807	953
Farmers & Merchants National Bank	100	10	204	419
First National Bank	100	41	585	827
Merced Security Savings Bank	300	119	1,840	2,259
Modesto—				
Farmers & Merchants Bank	49	37	190	305
First National Bank	200	85	778	1,302
Modesto Bank	250	82	562	996
Modesto Savings Bank	100	20	544	690
Security Savings Bank	25	24	160	197
Union Savings Bank	100	56	640	796
Napa—				
Bank of Napa	175	150	939	1,400
First National Bank	50	50	1,042	1,155
Napa Savings Bank	25	15	341	383
Jas. H. Goodman & Co. Bank	100	40	500	650
Nevada City—				
Citizens Bank	144	26	1,140	1,315
Oakland—				
Bank of Commerce	105	4	268	377
Central National Bank	1,000	665	6,050	9,260
First National Bank	500	162	3,100	3,262
Harbor Bank	110	8	225	360
Security Bank	420	84	1,451	2,112
Twenty-third Avenue Bank	25	5	260	295
West Oakland Bank	26	10	158	199
Central Savings Bank of Oakland	500	253	6,500	7,400
Farmers & Merchants Savings Bank	189	13	1,857	2,101
First Savings Bank	500	82	3,690	4,280
Oakland Bank of Savings	1,150	1,258	21,619	24,551
State Savings Bank	100	189	1,047	1,362
Union Savings Bank	300	652	5,185	6,137
Oroville—				
Bank of Oroville Savings	25	7	103	135
Bank of Rideout, Smith & Co.	30	14	370	421
First National Bank	50	61	534	657
Rideout-Smith National Bank	300	49	647	1,046
Oxnard—				
Bank of A. Levy, Inc	250	210	1,050	1,500
First National Bank	250	65	903	1,551
Oxnard Savings Bank	25	46	304	377
Pasadena—				
Citizens Savings Bank	250	6	430	630
Crown City Sav. & Trust Co.	200	30	680	910
First National Bank	200	137	1,799	2,353
National Bank of Pasadena	300	30	2,342	3,160
Pasadena Savings & Trust Co.	200	136	2,122	2,466
Security National Bank	100	5	450	705
State Bank of Pasadena	25	15	171	215
Union National Bank	100	90	2,044	2,369
Union Trust & Savings Bank	425	82	2,513	4,184
Petaluma—				
California Savings Bank	100	30	1,187	1,317
Petaluma National Bank	200	38	1,127	1,565
Petaluma Savings Bank	100	55	847	1,002
Petaluma Swiss-American Bk.	250	49	1,194	1,514
Sonoma County National Bank	400	177	1,050	1,845
Pomona—				
American National Bank	100	13	390	675
First National Bank	150	195	1,076	1,572
Savings Bank of Pomona	50	22	300	372
State Bank of Pomona	75	19	550	650
Porterville—				
First National Bank	100	112	890	1,238
Pioneer Bank	105	45	450	630
Red Bluff—				
Bank of Tehama County	300	232	1,600	2,310
Red Bluff National Bank	100	1	368	578
Redlands—				
Citizens National Bank	200	123	502	1,016
First National Bank	150	135	900	1,500
Redlands National Bank	150	227	781	1,409
Union Savings Bank	50	50	675	775

CALIFORNIA—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Richmond—				
Bank of Richmond	50	10	351	415
First National Bank	100	24	400	625
Mechanics Banks	50	9	342	401
Richmond Savings Bank	50	7	390	455
Riverside—				
Citizens National Bank	150	174	1,364	1,835
First National Bank	300	90	1,430	2,290
National Bank of Riverside	100	25	925	1,150
Peoples Loan & Trust Co	100	3	.....	200
Riverside Savings Bank & Trust Co.	100	35	1,232	1,384
Security Savings Bank	50	8	600	700
Sacramento—				
California National Bank	1,000	349	6,851	9,958
California Savings Bank	100	35	1,052	1,188
Capital Banking & Trust Co.	100	12	586	707
Capital National Bank	200	60	1,370	1,828
Farmers & Mechanics Savings Bank	350	40	1,853	2,243
Fort Sutter National Bank	200	79	2,422	2,891
Nat'l Bank of D. O. Mills Co.	500	940	4,802	6,732
Nippon Bank	39	5	65	109
Peoples Savings Bank	500	104	3,858	4,541
Sacramento Bank	500	761	7,592	8,854
Sacramento Valley Bank	600	42	1,729	2,472
Salinas—				
First National Bank	100	100	623	863
Monterey County Bank	120	127	946	1,350
Salinas City Bank	300	93	936	1,424
Salinas Valley Savings Bank	50	25	670	760
San Bernardino—				
California State Bank	100	17	480	604
Farmers Exchange Nat'l Bank	100	62	550	900
San Bernardino National Bank	100	300	1,182	1,684
San Bernardino Co. Sav. Bank	150	72	1,526	1,748
Sav. Bank of San Bernardino	50	12	401	464
San Diego—				
American National Bank	200	196	1,563	2,195
Bank of Commerce & Trust Co.	500	310	2,960	3,769
Citizens Savings Bank	100	35	800	900
East San Diego State Bank	25	1	92	119
First National Bank	150	323	2,828	3,459
Marine National Bank	100	40	875	1,140
Merchants National Bank	100	535	1,982	2,717
San Diego Savings Bank	200	282	3,480	4,112
Security Commercial & Savings Bank	111	18	573	702
Southern Trust & Savings Bk.	350	100	2,250	2,700
United States National Bank	100	26	410	650
University Avenue Bank	50	14	338	402
San Jose—				
Bank of San Jose	300	203	2,857	3,360
First National Bank	300	275	3,600	4,400
Garden City Bank & Trust Co.	300	297	2,323	2,920
San Jose Safe Deposit Bank	300	716	4,818	5,834
Security Savings Bank	100	82	1,335	1,517
Security State Bank	100	79	525	704
San Leandro—				
Bank of San Leandro	100	43	1,154	1,297
First National Bank	50	35	353	498
San Leandro State Bank	50	8	232	301
San Luis Obispo—				
Commercial Bank	300	130	2,788	3,234
Union National Bank	100	5	475	685
Santa Ana—				
California National Bank	100	25	500	700
Farmers & Merchants National Bank	200	115	1,357	2,010
First National Bank	300	298	1,860	2,758
Home Savings Bank	50	22	258	329
Orange County Savings & Trust Co.	255	72	889	1,217
Santa Ana Savings Bank	40	21	365	426
Santa Barbara—				
Central Bank	59	19	672	749
Commercial Bank	225	30	1,200	1,455
First National Bank	100	104	1,062	1,439

CALIFORNIA—(Cont'd) Santa Barbara—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Santa Barbara County National Bank	100	113	730	1,161
Santa Barbara Savings & Loan Bank	225	28	2,400	2,653
Santa Cruz—				
City Savings Bank	100	82	1,528	1,726
First National Bank	100	85	462	755
Farmers & Merchants National Bank	100	30	184	318
Peoples Savings Bank	32	38	437	512
Santa Cruz Bk. of Sav. & Loan	100	43	1,331	1,487
Santa Cruz Co. National Bank	150	107	437	795
Santa Maria—				
Bank of Santa Maria	200	200	1,750	2,300
First National Bank	50	42	368	510
Valley Savings Bank	25	36	261	321
Santa Monica—				
Bank of Santa Monica	110	29	1,115	1,272
Merchants National Bank	50	7	350	450
Santa Rosa—				
Exchange Bank	150	117	932	1,199
Santa Rosa Bank	200	27	965	1,210
Santa Rosa National Bank	200	40	1,050	1,615
Savings Bank of Santa Rosa	283	125	1,687	2,095
Union Savings Bank	50	32	655	738
Sonora—				
First National Bank	100	70	780	1,100
Sonora National Bank	75	8	287	424
Tuolumne County Bank	50	20	450	550
Stockton—				
Commercial & Savings Bank	300	204	2,275	2,779
Farmers & Merchants Bank	500	290	1,525	2,329
First National Bank	200	342	950	1,572
San Joaquin Valley Bank	264	458	3,911	4,758
Stockton Savings Bank	400	93	1,458	1,951

CALIFORNIA—(Cont'd) Stockton—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Stockton Savings & Loan Soc.	500	373	4,218	5,091
Union Safe Deposit Bank	152	9	524	696
Suisan—				
Bank of Suisan	100	581	956	1,645
First National Bank	100	17	190	380
Solano County Savings Bank	25	7	151	183
Turlock—				
Commercial Bank	75	91	897	1,078
Peoples State Bank	50	18	320	393
Vallejo—				
First National Bank	100	25	750	980
First Savings Bank	40	7	430	498
Vallejo Commercial Bank	150	12	1,019	1,196

ARIZONA—	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Bisbee—				
Bank of Bisbee	$ 50	$ 170	$ 1,541	$ 1,771
Citizens Bank & Trust Co.	50	4	175	229
Miners & Merchants Bank	50	95	1,544	1,698
Douglas—				
Bank of Douglas	50	116	1,186	1,366
First National Bank	100	40	977	1,166
Flagstaff—				
Arizona Central Bank	100	67	1,315	1,532
Citizens Bank	50	3	382	455
Globe—				
First National Bank	100	57	599	909
Old Dominion Com. Co.	22	122	299	455
Morenci—				
Gila Valley Bank & Trust Co.	100	127	2,324	2,558
State Bank of Morenci	30	6	132	168
Nogales—				
First National Bank	50	134	2,162	2,398
Santa Cruz Valley Bk. & Tr. Co	31	5	173	209
Sonora Bank & Trust Co.	100	6	709	815

Attention is called to the announcement on page 11

ARIZONA—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Phoenix—				
National Bank of Arizona	200	200	1,220	1,911
Phoenix National Bank	150	222	1,677	2,245
Phoenix Sav. Bk. & Trust Co.	100	64	627	795
Prescott—				
Bank of Arizona	50	194	1,124	1,368
Commercial Trust & Sav. Bk.	80	20	555	655
Prescott National Bank	100	205	976	1,385
Yavapi County Savings Bank	50	31	603	684
Tucson—				
Arizona National Bank	100	35	819	1,092
Consolidated National Bank	100	148	1,522	1,874
Merchants Bank & Trust Co.	50	30	466	546
Southern Ariz. Bk. & Trust Co.	75	59	830	968

IDAHO—	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Boise—				
Boise City National Bank	$ 250	$ 249	$2,280	$3,025
Boise Title & Trust Co.	100	10	77	203
First National Bank	300	380	1,826	2,706
Idaho National Bank	100	25	266	517
Idaho Trust & Savings Bank	200	11	509	720
Pacific National Bank	300	144	973	1,717
Lewiston—				
Empire National Bank	100	15	250	475
First National Bank	100	73	1,511	1,784
Idaho Trust Co.	50	10	101	164
Lewiston National Bank	100	55	800	1,000
Wallace—				
First National Bank	100	85	1,317	1,590
Wallace National Bank	100	43	2,062	2,255

NEVADA—	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Elko—				
First National Bank	$ 100	$ 20	$ 489	$ 709
Henderson Banking Co.	100	147	2,000	2,300

NEVADA—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Goldfield—				
John S. Cook & Co.	250	15	1,063	1,336
Reno—				
Bank of Nevada Savings & Trust Co.	100	10	1,426	1,537
Farmers & Merchants National Bank	200	30	1,120	1,550
Nixon National Bank	700	7	1,976	3,426
Scheeline Banking & Trust Co.	120	30	595	830
Washoe County Bank	500	208	1,699	2,451
Winnemucca—				
First National Bank	100	235	1,500	1,900
Winnemucca State Bank	100	3	130	233

OREGON—	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Albany—				
Albany State Bank	$ 60	$ 6	$ 167	$ 172
First National Bank	100	114	700	1,075
First Savings Bank	50	3	445	503
J. W. Cusick Co.	75	18	352	445
Astoria—				
Astoria National Bank	50	59	1,112	1,262
Astoria Savings Bank	130	155	1,400	1,700
First National Bank	100	35	840	1,020
Scandinavian-American Sav. Bk.	75	31	550	656
Baker—				
Baker Loan & Trust Co.	50	56	634	740
Citizens National Bank	100	19	370	595
First National Bank	200	200	1,160	1,760
Corvallis—				
Benton County National Bank	60	19	475	609
Corvallis State Bank	100	3	125	235
First National Bank	50	55	605	767
Eugene—				
Bank of Commerce	50	12	301	363
Eugene Loan & Savings Bank	100	115	716	965
First National Bank	100	225	1,400	1,950
U. S. National Bank	100	16	500	617

Attention is called to the announcement on page 11

OREGON—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
La Grande—				
La Grande National Bank	200	60	750	1,075
U. S. National Bank	100	14	400	600
Marshfield—				
First National Bank of Coos Bay	100	20	679	911
Flanagan & Bennett Bank	50	70	617	818
Medford—				
Farmers & Fruitgrowers Bank	50	3	145	202
First National Bank	100	57	651	950
Jackson County Bank	100	90	560	750
Medford National Bank	100	40	600	900
Oregon City—				
Bank of Oregon City	50	6	368	424
First National Bank	50	85	841	1,059
Pendleton—				
American National Bank	300	130	1,700	2,500
First National Bank	250	300	2,500	3,200
Portland—				
Ashley & Rumelin	50	5	170	226
Bank of Kenton	50	5	175	230
Bank of Sellwood	50	6	197	253
Geo. W. Bates & Co.	100	8	682	792
Citizens Bank	100	19	670	790
East Side Bank	50	32	500	582
First National Bank	1,500	1,150	17,498	22,697
Hartman & Thompson	100	18	389	507
Hibernia Savings Bank	200	93	2,701	3,040
Ladd & Tilton Bank	1,000	1,300	13,200	15,500
Lumbermen's National Bank	1,000	233	5,212	6,696
Lumbermen's Trust Co.	500	134	.....	648
Merchants National Bank	500	110	4,310	4,920
Montavilla Savings Bank	50	3	49	103
Multnomah State Bank	15	3	49	100
The Northwestern National Bank	500	112	3,457	4,155
Portland Trust & Savings Bank	300	52	1,275	1,627
Scandinavian American Bank	100	25	1,717	1,842
Security Savings & Trust Co.	250	220	637	1,186
United States National Bank	1,000	1,292	9,195	12,778

OREGON—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Salem—				
Capital National Bank	125	37	787	1,049
Salem Bank of Commerce	50	5	226	281
U. S. National Bank	100	110	1,125	1,500
Ladd & Bush	500	121	2,275	2,950
The Dalles—				
First National Bank	100	133	691	1,027
French & Co.	200	135	882	1,221

WASHINGTON—	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Aberdeen—				
Chehalis County Bank	$ 25	$ 1	$ 200	$ 226
United States Trust Co.	50	17	280	351
Hayes & Hayes	250	56	2,079	2,372
Bellingham—				
Bellingham National Bank	200	280	1,500	2,146
First National Bank	200	136	1,845	2,230
Northwestern National Bank	100	11	590	700
Northwestern State Bank	100	29	1,112	1,241
Centralia—				
Farmers & Merchants Bank	75	6	255	336
Field & Lease	25	21	120	166
Union Loan & Trust Co.	50	15	280	350
Chehalis—				
Chehalis National Bank	50	8	242	320
Coffman, Dobson & Co.	50	165	1,050	1,220
Security State Bank	25	24	232	282
Colfax—				
Colfax National Bank	200	40	1,040	1,560
Colfax State Bank	60	7	133	206
Farmers National Bank	100	50	628	854
First Savings & Trust Bank	50	22	486	563
Dayton—				
Broughton National Bank	50	12	240	325
Columbia National Bank	100	146	838	1,211
Everett—				
Bank of Commerce	100	25	750	850

Attention is called to the announcement on page 11

WASHINGTON—(Cont'd) Everett—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Citizens Bank & Trust Co.	100	29	271	400
Everett Trust & Savings Bank	25	36	425	492
First National Bank	250	101	3,046	3,615
Hoquiam—				
First National Bank	100	126	1,192	1,469
Lumberman's Bank	100	27	431	558
North Yakima—				
First National Bank	100	225	2,000	2,500
Central Bank & Trust Co.	50	3	179	255
Yakima National Bank	50	227	1,381	1,658
Yakima Trust Co.	100	21	421	550
Yakima Valley Bank	100	89	598	712
Olympia—				
Capital National Bank	100	179	1,564	1,936
Olympia National Bank	50	89	542	705
Seattle—				
Amer. Savings Bank & Trust Co.	600	85	2,150	2,835
Bank for Savings in Seattle	400	21	660	1,075
Broadway State Bank	25	6	150	188
Citizens Bank	25	1	159	197
Dexter Horton National Bank	1,200	280	9,761	11,289
Dexter Horton Trust & Sav. Bk.	400	150	6,600	7,300
First National Bank	300	146	4,643	5,226
Fremont State Bank	50	3	145	213
German-American Bank	200	5	760	1,030
Green Lake State Bank	25	12	142	179
Japanese Commercial Bank	50	36	462	549
King County State Bank	20	1	70	91
Metropolitan Bank	100	136	2,163	2,413
Mortgage Trust & Savings Bank	100	7	1,373	1,480
National Bank of Commerce	1,000	1,250	10,876	13,511
National City Bank	500	150	2,000	2,700
Northern Bank & Trust Co.	100	45	1,250	1,435
Northwest Trust & Safe Deposit Co.	100	24	1,101	1,225
Oriental-American Bank	40	2	197	239
Peoples Savings Bank	100	238	2,327	2,665

WASHINGTON—(Cont'd) Seattle—(Cont'd)	Capital	Surp. and Profits	Gross Deposits	Gross Resources
Rainier Valley State Bank	25	3	144	172
Scandinavian-American Bank	500	559	11,018	12,078
Seattle National Bank	1,000	405	12,324	14,729
Seattle Trust Co.	250	82	.....	345
State Bank of Seattle	100	30	1,306	1,437
Union Savings & Trust Co.	600	230	3,850	4,660
University State Bank	50	5	510	565
West Seattle State Bank	10	1	60	75
Spokane—				
Exchange National Bank	1,000	317	4,812	7,129
Farmers & Mechanics Bank	50	9	285	345
Fidelity National Bank	200	66	2,145	2,638
National Bank of Commerce	200	20	600	1,000
Old National Bank	1,000	547	10,185	12,733
Scandinavian-American Bank	100	40	750	890
Spokane & Eastern Trust Co.	300	702	12,547	13,548
Spokane State Bank	50	15	200	265
Union Park Bank	25	2	105	132
Union Trust & Savings Bank	500	104	671	6,683
Washington Safe Dep. & Tr. Co.	100	142	.....	331
Tacoma—				
Fidelity Trust Company Bank	500	506	3,808	4,839
Bankers Trust Co.	300	35	765	1,100
National Bank of Tacoma	1,000	185	8,000	9,700
North Pacific Bank	25	26	175	228
Puget Sound State Bank	100	38	742	872
Tacoma Sav. Bank & Trust Co.	200	31	904	1,135
Vancouver—				
United States National Bank	100	30	450	615
Vancouver National Bank	100	25	615	922
Washington Exchange Bank	50	4	224	286
Walla Walla—				
Baker-Boyer National Bank	100	243	1,801	2,194
Farmers Savings Bank	200	114	716	1,000
First National Bank	200	312	1,410	2,100
Peoples State Bank	50	25	475	566
Third National Bank	100	22	579	726

Attention is called to the announcement on page 11

DESCRIPTIVE SECTION

Geo. Drumheller of Walla Walla, Wash., aims yearly to secure the largest wheat check ever given to an individual. All told, he has purchased nine of these Holt Combined Harvesters since 1899. His 1913 wheat check was for 173,431 bushels, amounting to $137,632.24.

A UNIQUE CALIFORNIA INDUSTRY.

The Holt Manufacturing Company, at Stockton, Has World Market for Farm Machinery Specialties—Caterpillar Tractors and Combined Harvesters.

By L. E. Webster.

We expect the daring—the unconventional—from California, the unusual State. We look for surprises. We take for granted a change of climate from tropical to arctic as we ascend a main-traveled highway, and are not astonished at the "57 varieties" of agriculture we note along the road. Therefore, we should probably have been disappointed to find California's largest farm-machinery concern—in fact, the largest on the Pacific Coast—following the conventional lines of eastern manufacturers of similar products. But Benjamin Holt, the dominating mechanical mind of The Holt Manufacturing Company, is essentially a pioneer, and while sales and financial policies have necessarily been more or less tempered by external conditions, the products of the factories are typically Californian in their distinctiveness.

Many years ago "Ben" Holt saw a header cutting barley, while a big stationary threshing outfit in the same field separated the grain from the straw. "Those two machines ought to be in one," he said, and set about to combine them. His neighbors and associates objected vigorously, but Holt had a factor of obstinacy of the kind possessed by McCormick and Edison. He built the combined harvester, perfected it, and left it for others to market.

Steam became a necessity for plowing and freighting. The Holts made steam-plowing outfits as a matter of everyday routine, years before the opening prairies of Kansas, the Dakotas and Canada stimulated eastern thresher manufacturers to build plowing engines. Holt engines pulled the Holt harvesters. They furnished steam for auxiliary motors on the harvesters long before the gasoline motor came into its own. Other motors on heavy wagons—all fed from the tractor boiler—helped move big ore and lumber trains over steep mountain grades. Holt built wagons—there were no others equal to the severe demands.

Stockton, the principal seat of the business, lay at the gateway to the great valleys of the Sacramento and the San Joaquin, in early days the greatest wheat country in the world. It was a new country, with no machine shops at the cross-roads, and few mechanics outside of the cities—a great rough country, its great branches run by masterful men, who drove their way to fortune with a smashing hand. And Holt built big, rugged machines that withstood all manner of use and abuse.

The hills of California, Oregon and Washington grew splendid grain, but it was left to the Holts to adapt their harvester for safe use on steep hillsides, and thus add hundreds of thousands of acres to the available crop area.

THE GAS HARVESTER.

Gasoline came to replace steam. Horses and feed rose in price, and hot weather annually took its toll. The Holt answer was a separate gas engine mounted on the harvester frame. The engine drove the cutter bar and threshing mechanism—half the horses then pulled the machine. It cost less, and saved the down and tangled grain besides, for stopping the horses no longer stopped the cutting and threshing. Sales of the horse harvester fell rapidly before the gas harvester's advance, and owners of old models overtaxed the Holt manufacturing facilities in their eagerness to add this improvement and be profitably up-to-date.

So firmly established has the Holt Combined Harvester become that it is safe to say 90 per cent of the grain harvested in California, and three-quarters of all grown on the Pacific Coast, passes through its capacious maw. California alone kept 3,500 of these monsters at work for months, gathering this season's crop.

The history of this aggressive concern dates back to the sixties, when Charles H. Holt and Harrison Holt pooled their savings and started a hardwood lumber and wagon material business in San Francisco. Charles stayed in the West, the other brother going back to the home town of Concord, N. H., as buyer for the firm. Two other brothers, Frank and Benjamin, later joined The Holt Brothers Company as partners, Benjamin coming to California in 1883, when the trade in the Golden State seemed to justify a factory on the ground. Strangely enough, the dry climate that set the spokes a-rattling on prairie schooners in the Valley, is to blame for Stockton's taking away from the foggy Golden Gate the wheel works that has grown into a concern of such splendid proportions.

SMALL BEGINNINGS.

Yankee-bred, with New England notions of thrift, the Holts grew under the influence of the large ideas that California breeds in men, and their progress was steady and sure. Charles, the business man, and Benjamin, the inventor and mechanic, built well. One by one competitors sprang up, flourished awhile and fell. The Holts' only notice was to make arrangements to supply extras for the machines left in the field without a parent—a consistent policy which has won countless friends and customers among the users of twenty-odd makes of harvesters and engines, and a comfortable profit besides.

Close by Stockton lay the fertile delta islands, seemingly more fit for the production of frogs and tule thickets than of wheat. But wide wheels on engines and harvesters brought these lands into profitable subjection. Six—twelve—even eighteen feet of wheels on either side of a tractor—veritable monsters of the ranch—sent barge load upon barge load of grain up the Stockton Channel

to the railroad and down the river to the bay and waiting ships. But the Holts dreamed of a narrower wheel —not so high, not so wide—and finally threw away wheels altogether. Thus the Caterpillar track was born.

Holt Self-Propelled Harvester operating on Arthur D. Jones' ranch near Spokane, Wash. The last word in combinations—a combined harvester embodying a tractor. Made only by Holt.

The "Caterpillar," as the Holts and their followers know it, is not the larva of a dainty bat-wing butterfly, but the vital principle of a neat, compact tractor of strikingly unique design. The Caterpillar track is an endless belt of steel segments, which the tractor lays down, rolls forward upon, and picks up again. With it, The Holt Manufacturing Company again created a new industry, and opened up to cultivation by cheap mechanical power vast tracts that could not be farmed at all, or at least with great difficulty, by the use of animals.

THE CATERPILLAR TRACTOR.

Briefly, the Caterpillar is a tractor for pulling plows, harrows, seeders, harvesters, wagons or other machinery; for building roads; for threshing, and filling silos; crushing rock; uprooting stumps; building levees; hauling cannon or mixing concrete; shunting cars or baling hay; clearing sage brush and pumping water to make the desert bloom. With the proper tools, it has a variety of uses so great as to defy an attempt to catalog them. It does all the work of an ordinary tractor or stationary engine. It does infinitely more, because, owing to the length and breadth of its supporting track, it can work over land on which a horse cannot safely walk, and through conservation of power it can surmount grades impassable to any old-style tractor of feasible motor power.

There is no separate field for the Caterpillar. Its advantages appeal to every user of tractive power, and its owners include farmers; contractors; highway commissions; counties, townships and municipalities; armies and railways; lumbermen; drainage and reclamation organizations; agricultural colleges; great sugar companies; and others having similar power needs.

The site of the world's largest reservoir, that of Greater New York, was cleared by yanking out acres of trees with the Caterpillar. The famous Los Angeles Aqueduct was completed well within estimates, largely because twenty-eight Caterpillars cut the cost of hauling materials across the Mojave Desert to one-third the horse-haul figure. Arthur Brisbane, the great Hearst editorial writer, first by a challenge to all manufacturers, and then by a sweeping editorial statement, has drawn widespread attention to the success of the tractor on his New Jersey farm.

The American Beet Sugar Company bought seven Caterpillars, and stopped importing 30,000-dollar English cable-plowing outfits. The U. S. and Russian governments, the Southern Pacific Railway, and a list of millionaire farmers that resembles the Social Register, have testified by purchases to the outstanding quality of the tractor.

WORLD-WIDE EXPORTS.

The Caterpillar is now used on every continent, from Nome to Cape Horn, and from Manila to St. Petersburg. It is working in Australia, the Philippines, Mexico, Chile, Hawaii, Argentina, Cuba, India, South Africa, Algeria, Russia, Austria, Hungary, Germany, Spain, Belgium—in fact, in every great agricultural district in the world. Fourteen foreign agents are financing its successful introduction, with the help of the company's experts or service men, and semi-occasional visits of sales representatives, who invariably have technical training, and thus combine engineering investigations with their other duties.

It is freely predicted that inside of 25 years the Caterpillar principle will prevail in the tractor field, owing to its advantage of being useful in soft ground where wheel tractors fail to get a footing, and to the additional percentage of motor power which it transforms into tractive effort, or pull. The early difficulties of complicated design and excessive wear have been successfully overcome. The cost of manufacture, and consequent selling price, has reached a competitive basis, and the enthusiastic loyalty of the two thousand-odd owners of Caterpillar tractors has given the machine a wide appeal.

A Caterpillar, however, is useful only when furnishing power to an operative tool or machine. The Holt Company has long been aware of the advantages of selling in every case a complete outfit of dependable quality, and its disc plows, moldboard plows (the universal "Stockton Gang"), harrows, scrapers, freight wagons, etc., are important factors in the success of the Stockton plant.

Latest, but by no means last nor least, the company has now reached the apparent climax in combinations, that of a Caterpillar Tractor with a combined harvester. The self-propelled harvester reverses the original order, the mounted motor running the tractor parts as well as the knife and separator. Here is independence of animal power—and of human labor—carried to the extreme, and again Holt has a clear field. The idea is too daring as yet for imitation.

The Caterpillar name and trademark are, undoubtedly, two of the company's most valuable assets. They have been protected in all civilized countries and the translations in the different languages are included in the protection. For instance, in France the Caterpillar is known as "La Chenille"; in Latin countries, as "Oruga"; in Germany, as "der Raupe"; etc. The aggressive use of this name, and its fitness in suggesting the action of the propelling track has resulted in its general adoption as descriptive of all machines of this or similar type—in one way unfortunate, yet in another productive of intensely more rapid popularization of the Caterpillar idea.

CAREFUL EXPANSION.

The Company has always followed a conservative quality of expansion, first starting out toward the North, and, four years ago, to the East, then to foreign countries. It

Two 45-h. p. Caterpillars in the Mojave Desert, freighting material for the Los Angeles Aqueduct, one of the engineering wonders of the world.

is rather remarkable that, of all substantial farm machinery companies in America, The Holt Manufacturing Company is the first one to develop west of the Rocky Mountains and invade the East from that stronghold.

The eastern plant, at Peoria, Ill., is devoted entirely to the production of Caterpillars for the tributary trade and Atlantic exports. This auxiliary plant is of further distinct advantage in securing the Company's output against unfavorable local conditions in the labor or material markets. At the present time this plant makes only the 30 and 60-horsepower models, while at Stockton the sizes include also a 15 and a 75-horsepower size.

The Peoria plant was purchased from the Colean Manufacturing Company, which had equipped it for the building of steam traction engines and threshers. It is splendidly situated as to railroad facilities, and the buildings and equipment are unusually well arranged for economical production.

FACTORY ORGANIZATION.

The factory at Stockton, with yards and storage houses, covers an area of seven city blocks. The buildings are of as substantial nature as the mild climate demands. The shop equipment is modern in every respect, although installed with due regard for the basic idea of thrift and the practical needs of manufacture. In short, there are no frills, but all of the necessities.

The factory staff has been well selected. Besides an experienced photographer and a chemist, the Company has an engineering corps which, though largely made up of native Californians, has been educated in the best universities of the United States, and has had the advantage of study and field experience in Europe and South America, as well as in Canada and the United States.

The number of employees varies with the season, ranging from 600 to 750 at Stockton during the peak of the late spring months, and from 125 to 200 at Peoria. Counting the field sales force, the total is about 1,000 at the highest point of the year. There is a very small percentage of transient laborers, the great bulk being permanent residents, and a large number own their own homes. At Stockton, particularly, sufficient time has elapsed to allow of long individual experience, and the Company is fortunate in its large corps of workers who have been on the payroll ten, twenty and even forty years.

45-h. p. Caterpillar with a load of logs in woods at Newport, Wash.

The wage scale is satisfactory to both employed and employer, and labor troubles have been few and unimportant. The men respond promptly to safety measures and are unusually faithful in utilizing the numerous safety devices installed, as well as in co-operating with the Company in the settlement of accident claims. The Stockton employees' picnic, last June, was attended by over three thousand people, including families of the workmen, and a monster parade, organized by men in the shops, publicly demonstrated a splendid esprit de corps.

SENSIBLE SALES POLICY.

The Holt sales policy is as unique in the agricultural field as the machines it covers. Contrary to the long-term, partial-payment policy of its large eastern competitors, the Holt practice produces short term or cash sales. Customers' notes maturing a year or more from date of sale are rare—so rare that their absence, with a rigid credit policy, renders a formal collection department unnecessary, and losses are practically nothing. As a result of this policy a large volume of sales is possible, practically equaling each year the capital and surplus invested, as compared with a ratio of one dollar of sales to two of capital and surplus in the farm machinery industry as a whole.

The sales organization is well-balanced, and is managed from three central points, Stockton, Calif., Spokane, Wash., and Peoria, Ill. Other branches, and district agencies covering one or more states, are maintained at San Francisco, Los Angeles, Portland, Walla Walla, and Calgary in the West, and Fargo, Denver, Omaha, Wichita, New Orleans and New York, in the East.

A consistent advertising campaign is being conducted from the home office, making use of farm, thresher, implement dealer, engineering, highway, lumber, sugar, mining, and export journals, in addition to a monthly magazine to prospects, and a well-directed follow-up of catalogs, folders and dictated correspondence. Perhaps the most unique and successful form of advertising employed is that of moving pictures. By the use of portable Edison Kinetoscopes, any office of the Company can show Holt machinery in operation, as well as details of construction that can scarcely be visualized otherwise.

Consistent with its position of leadership, the Company is installing a splendid exhibit at the Panama-Pacific Exposition. The entire area of Section 7, Agricultural Palace, will be devoted to a display of Holt products and the entertainment of visitors. The Company will exhibit also at the San Diego Exposition.

ADMINISTRATION.

The Company still maintains its headquarters at Stockton, where are located Benjamin Holt, President; P. E. Holt, Vice-President and General Manager; P. Ehrenfeldt, Secretary; C. L. Neumiller, General Counsel; and necessary home office employees. The Board of Directors comprises Benjamin Holt, P. E. Holt, C. L. Neumiller, C. Parker Holt, Treasurer, San Francisco, Calif.; T. F. Baxter, Boston, Mass.; Ben C. Holt, Spokane; M. M. Baker, Vice-President and Manager Eastern Division, Peoria, Ill.; R. S. Springer, Vice-President and Manager Northern Division, Spokane, Wash.; and D. N. Gilmore, Stockton, Calif. With few exceptions, the executive positions in the Western Division are cared for by the general officers.

A tremendous amount of detail has been accomplished during the last year in the matter of reorganization. On July 1, 1913, all of the allied Holt companies were brought into the parent company. The jobbing feature of the business was eliminated as soon as possible thereafter, and the entire effort devoted to building up the manufacture and sale of its own products. The Stockton plant has been rearranged on a more efficient basis and several departments added, to cut down the expenditures for outside work. Organization charts, a system of written standard-practice instructions, a practical cost system and other common-sense efficiency features have been installed.

The Company has enjoyed a steady growth, with no critical periods of depression or shrinkage in volume. The surplus has risen steadily until it nearly doubles the capital stock. Sales have shown a gain each year, and sales to the present date promise that the volume in 1914 will much more than equal that for last year, in spite of the elimination of a half-million-dollar jobbing business in hardware and kindred lines. The annual statement as of December 31, 1913, shows an extremely favorable situation, with nothing credited to good-will. The foundations of the business were well laid, and practically continuous management during its entire history has made this out-of-the-way concern one of the world's leaders.

DEUTSCHE BANK

Registered in Berlin as a Limited Company under Prussian Law, recognized in England by the Declaration exchanged between the British and German governments, March 27, 1874, and registered in London under the Companies (Consolidation) Act, 1908.

Capital Fully Paid - 250,000,000 Marks
Reserves about - 170,000,000 "

Head Office, BERLIN

London Bankers:
BANK OF ENGLAND. NATIONAL PROVINCIAL BANK OF ENGLAND, LTD.
UNION OF LONDON AND SMITHS BANK, LTD.

Branches

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