

THE PROJECTED TRANS-PACIFIC CABLE

THIRTEEN submarine telegraph cables cross the Atlantic between Europe and North America; three cables connect Europe and South America; Africa's coast is girdled; even antipodal Australia and New Zealand have been reached; but the Pacific ocean yet remains to be spanned. The great girdle around the globe will never be complete until the little gap is filled between America and Asia. Then the modern Puck will be able to put his "girdle round about the earth" not in forty minutes, but in that many seconds.

The wonder is, as one of our statesmen recently said, not that vast oceans have been spanned by cable, but that this vastest of oceans has not been crossed before. That the nineteenth century should have come and gone without a submarine cable connecting the continents adjacent to the Pacific is almost inexplicable. It need not be argued that there is a great need of it; we know that for many years there has been agitation respecting it, and within three years emergencies have arisen that have demanded its completion.

Several times within the past few years attention has been called to the fact that congress is legislating about the granting of a charter for the building of a transpacific cable. Private companies have offered to construct it, both with and without the aid of governmental subsidies, and yet the project has hung fire. Since the acquisition of oriental territory by our government, since the annexation of Hawaii and taking of Midway or Wake island, the cession of Guam and the Philippines, we have had a chain of islands stretching in an uneven line from our western coast to Asia, forming, as it were, stepping stones across the Pacific. They are rather far apart, to be sure, and to connect them will require a cable nearly 5,000 miles in length, with an expenditure of from \$1,000,000 to \$10,000,000. But that is nothing. When our Uncle Sam shall have drawn on his famous "seven league boots," he will step across that intervening stretch of ocean in a jiffy. According to recently completed surveys, the distance from San Francisco to Hawaii is about 2,100 miles, thence to Wake island, that low lying spot in mid-ocean, it is 2,000 miles; 1,300 more to Guam, and 1,370 to the east coast of Luzon, whence a short land line reaches into Manila. From Manila to Hongkong is 660 miles, where connection will be made with the continental systems and cables—the Great Northern and Chinese land line and the Eastern Extension—that make for Europe and the Atlantic.

The Pacific was charted some years ago with reference to the laying of a cable between California and Hawaii, and only last year Lieutenant Commander H. M. Hodge on the collier Nero made a ten months' survey of proposed routes between our western coast and the Asian islands. His objectives were San Francisco and Yokohama, taking in the Philippines, Guam, Midway island and Hawaii. Between the time of leaving San Francisco and the return the Nero spent 28 days and 19 hours, steamed 29,235 knots and put in 240 days of actual work. "To the best of my knowledge," reported Commander Hodge, "I do not believe a ca-

ble route was ever so extensively and thoroughly surveyed and developed. I believe the result of the survey proves the route to be eminently satisfactory and thoroughly practicable."

There are, in fact, no insuperable obstacles to the laying of a cable, the only adverse development being that of great depth, in some places the soundings showing more than 5,000 fathoms. The two deepest soundings gave 5,100 and 5,200 fathoms, or nearly six miles, which far exceeds the height of any mountain in America. But the deepest spot can be avoided as well as the highest submarine mountains, which are more dreaded by cable layers than anything else, owing to the danger of breakage on account of strain and the possibility of volcanic action raising the temperature of the water and setting free elements inimical to the composition of the cables. But there is a vast plateau on this route, and in the ooze of the ocean depths, once the cable has been successfully laid, it may rest

part, but it is doubtful if that would be feasible, though the route for a great transiberian and Alaskan line was surveyed years ago.

Southward, again, we find the Aleutian islands, stretching invitingly from Alaska to Kamchatka, by which a succession of land lines and cables could be run from Seattle or Vancouver, via Sitka, to Kamchatka, to connect with the transiberian line ending for the present at the mouth of the Amur.

The most inviting route is that be-

ing an all British line around the world, or, rather, two routes have been surveyed—the first between Vancouver, in British Columbia, via Unalakleet and the Aleutian archipelago, to Japan, a distance of about 3,000 miles; and the second to connect Australia and British Columbia via the Fiji, not far from 7,000 miles.

Australia and New Zealand are connected with the continental system by cables southward from China and India, and eight years ago Queensland,

then run the risk of safe transmission across Asia, across Europe or under the Mediterranean and across the Atlantic, are still fresh in mind. The route taken by Dewey's messages which electrified the world and gave us news of the destruction of the Spanish fleet is also the only one available at present. A message must first traverse almost two-thirds the distance around the globe in order to reach a point only one-third that distance away.

The advocates of governmental own-

ing that the government would pay not to exceed \$300,000 annually for twenty years. It was urged against this bill that the payments as proposed, aggregating \$6,000,000, would be equal to more than half the expense of construction; but the latest proposition, by a private corporation, is, it is understood, to construct the cable without any concession from the government except authority for landing stations on the shores of the United States and our eastern possessions. The system is to be maintained without cost to the government, which is to have the right of way in time of war and the privilege of sending messages at a reduction of from 40 to 60 per cent from present rates. The line to Honolulu, it is agreed, shall be open and in running order within nine or ten months after the commencement of the work.

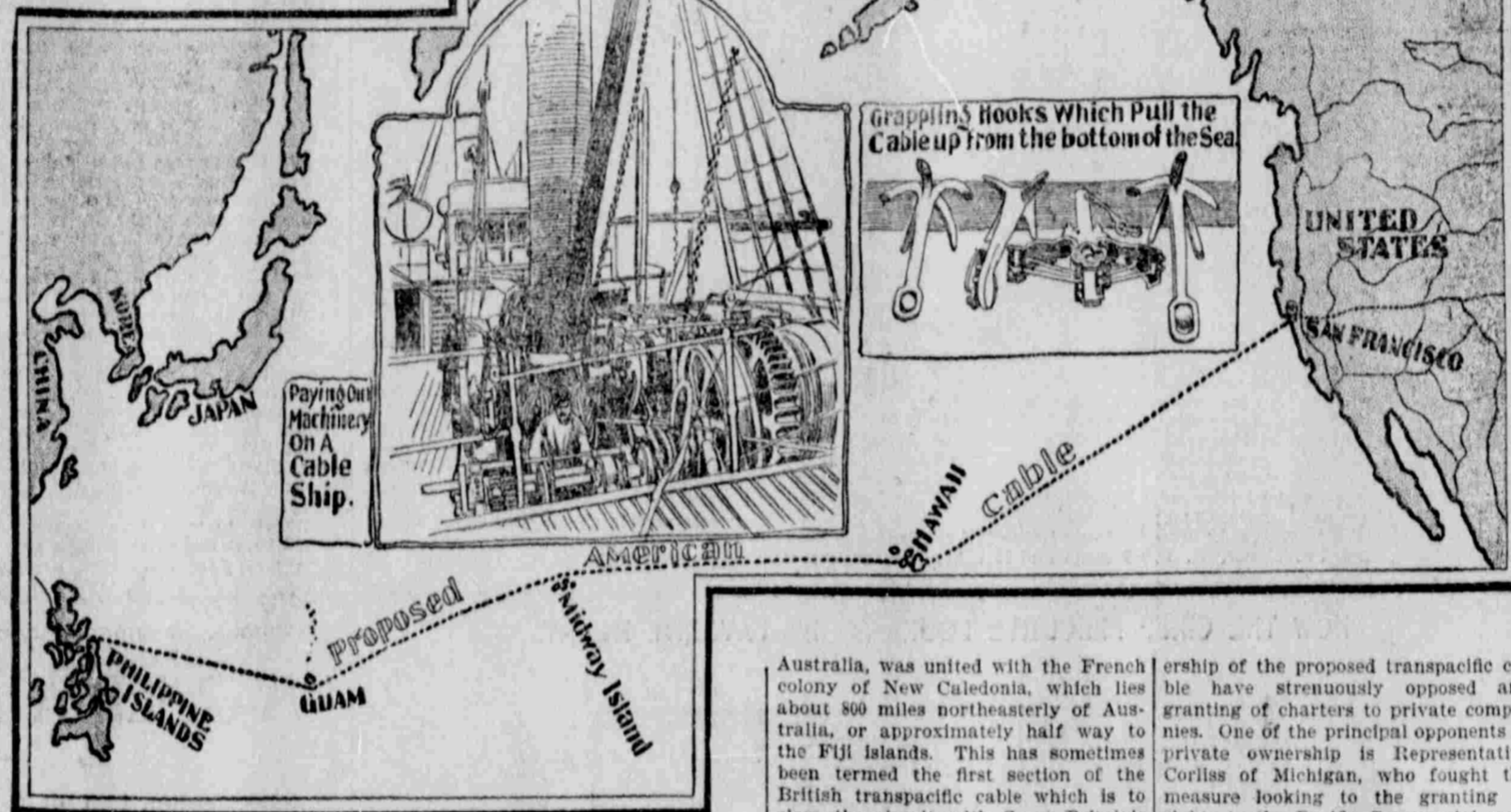
It is estimated that the United States government has expended about \$300,000 annually since the Philippines came into our possession, an expenditure which will probably be continued in the future for some time to come. The cost of a cable message to and from Manila, regular rate, is \$2.25 per word, including address; to the government from \$1.10 to \$1.55 per word. To Yokohama the regular rate is \$1.75 per word, either by the northern route through Siberia or by the southern via the Indian ocean and the Mediterranean. The business rate to Hongkong is \$1.60 per word.

The line to Honolulu, it is claimed, can be constructed for about \$2,500,000 and maintained at an annual cost of \$70,000, not including repairs and reckoning the life of a cable at twenty years. The average cost of a submarine cable such as would be required in the Pacific is estimated at from \$1,000 to \$1,200 per mile. The estimate on the cost of the proposed British cable from Australia to British Columbia was about \$8,500,000. The average depth was given as about 5,000 fathoms, which exceeded, it was stated, the depth of any cable then laid. The average depth along the central route is from two and one-half to three miles.

There were 330 submarine cables, with a total length of about 175,000 miles, at the beginning of this year, or nearly enough to seven times girdle the globe, and yet, as already stated, not one transpacific cable in existence. Of the total cable mileage the various governments of the world owned about one-eighth, France leading with 5,000 miles; Germany being second with 2,225; Great Britain, 2,000; Spain, 1,800, and Japan, 1,500 miles. Indirectly Great Britain controls and practically owns vastly more mileage than is given in the statistics.

The United States is the only great power which at the opening of this century owned no submarine cables; but, having come into possession of Spain's telegraph land lines in Porto Rico and the Philippines, this government is forwarding the construction of cables in the latter islands, General Greely being at present engaged in laying them on the finely equipped cable ship Burnside. Having through force of circumstances become a cable owning nation, it remains to be seen whether the United States will embark more extensively in the venture. The question will probably be settled by the forthcoming congress.

ELBERT O. WOODSON.



for years in greater safety than if nearer the surface, exposed to the dangers of navigation and the assaults of whales, swordfish and other leviathans pertaining to Neptune's domain.

While the route necessarily chosen as that for the projected cable uniting the continental United States with its insular possessions in the Pacific is most favorable to the project, it is not the shortest distance between our Pacific coast and Asia. In a survey of the Pacific from the equator to the arctic circle it will be seen that the two continents approach each other most nearly in the northern region. The shortest possible length of submarine cable connecting Asia and America would be, of course, across Bering strait, less than forty miles in width in its narrowest

tween San Francisco and Yokohama, about 800 miles, but there are intervening islands. It would be a straightaway stretch, like that across the Atlantic between Great Britain and America.

The fourth route, which is the one surveyed and practically selected, is that between California and the Philippines, via Hawaii, the Midway and Guam, with a cable to Hongkong and perhaps another to Yokohama. This route dips southwesterly from our coast until below the tropic of Cancer, reaching about its southern limit at Guam, thence westerly to Luzon and northwesterly to Hongkong.

Still another route across the Pacific is that surveyed and coveted by the British government for the completion

Australia, was united with the French colony of New Caledonia, which lies about 800 miles northwesterly of Australia, or approximately half way to the Fiji islands. This has sometimes been termed the first section of the British transpacific cable which is to close the circuit with Great Britain's dominions across the sea. Unless, then, the United States shall construct its line very soon or the perfection of wireless telegraphy obviates the necessity of laying cables in the very near future, the British line will probably eventuate, and the gap will be closed.

Both the British and United States governments feel the necessity of controlling absolutely at least one telegraphic cable between the home country and outlying possessions, owing to strategic exigencies that are sure to arise in case of war. In truth, our experience at and after the outbreak of hostilities in the Philippines, when Admiral Dewey was cut off from communication with his government and, having cut the British cable, then in hostile hands, had to send his communications first to Hongkong by ship and

ership of the proposed transpacific cable have strenuously opposed any granting of charters to private companies. One of the principal opponents of private ownership is Representative Corbiss of Michigan, who fought the measure looking to the granting of rights to the Pacific Commercial company two years ago and who, it was recently reported, called on President Roosevelt to enter his protest against the granting of landing privileges to that or to any other company. He believes that the commerce of the Pacific will warrant the immense outlay that the construction of a cable would involve and also that the government would benefit immeasurably not only by the saving in tolls, but by its freedom from oversight and hampering restrictions in time of war.

A bill was reported to the last congress by the house committee on interstate and foreign affairs providing for the construction of a cable connecting the west coast of the United States with the Philippines via Honolulu and Guam, authorizing the postmaster general to advertise for bids and guaran-

SOLD AIR MADE BY AN AMERICAN SCIENTIST

IT was only a comparatively short time ago that the world was astonished by the announcement of "liquid air on tap." Now an American scientist goes a step further and tells us he has produced air "in chunks." If, as was predicted when liquid air was brought to the attention of the scientific world, an agent had been found for the revolutionizing of aerial navigation, the use of explosives in industrial pursuits and in warfare, refrigeration, the purification of chemicals, the prevention of diseases, etc., how much more valuable will solid air prove in all these processes! In a word, the advantage of solid air over liquid and, if the term may be allowed, gaseous air consists in its greater power of refrigeration. While liquid air can be made at a temperature of 312 degrees below zero, the solid substance is only producible at an immeasurable degree below the other. While liquid air came from the rapid evaporation of common atmosphere, the solid product is a result of the evaporation of the liquid.

It is to an American, Professor A. L. Metz of Tulane university, Louisiana, that the world owes this latest and perhaps greatest of discoveries in physics. Its history emphasizes the fact that no great discovery is ever the result of one man's cogitations or experiments, but that the process is gradually unfolded,

larized the discovery in America. It might seem invidious to mention some of those who are identified with the development of the process and not all, but this enumeration is made merely to illustrate the activity with which trained minds seize upon any sign of a new vein or lead that shall possibly unfold to them the hitherto secret mines of wealth in nature's arcanum. The true scientist is broadminded, ready to sacrifice himself in contributing to the world's fund of information, and especially

of course, is taken for granted. The piece of air was seized with a pair of forceps, which stuck so hard that they could not be removed. Struck with a hammer, the tool rebounded from the lump of air as though it were India rubber. It can be whittled and shaved, and it is declared that with a piece of solid air one may manufacture his own

domestic economy solid air will prove invaluable, for the freezing process mechanically eliminates all impurities. The water in whisky, for example, freezes and is separated from its other component elements at a temperature of 32 degrees F.; between 150 and 190 below fuel oil and other deleterious ingredients assume a solid form, leaving

the pure alcohol, which does not freeze under a temperature of 202 below zero. Thus the process is sure to come into common use in the future, near or remote, for the purification of all liquids which have hitherto been considerably adulterated. If a liquid is suspected of being adulterated, it will only be necessary to place it in the solid air refrigerator (which will be an adjunct of every twentieth century model house of the future) and eliminate the adulterants by refrigeration, the degree at which each will separate from the whole being indicated by an automatically registering scale visible at a glance.

It is predicted that liquid air will eventually supplant steam, electricity, ice, coal, the use of anesthetics as hitherto employed and all explosives—in fact, prove a universal and exhaustless servant to man in almost every conceivable capacity. It doubtless will, but not right away, and its correlative,

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solid air, will do all that is claimed for the liquid and probably vastly more. Cartridges will be made of it and used in revolvers, rifles and cannon, the force generated from it being almost inconceivably greater than from any explosive in use today. Mines and quarries will be worked with it. Thousands of lives will be saved as well as lost by its use. In the warfare of the future, it is claimed, the opposing armies will hurl at each other bullets and cannon balls of solid air, before which the strongest earthworks will crumble to pieces and the vastest army melt away. The old fable of "biting chunks out of the atmosphere" will be actually realized—that is, it can be—but one's teeth would crumble in a second in an intensity of cold that consumes pieces of steel as a flame consumes wood or wax.

That we shall some time be able to see and touch an element which most of us know only in the invisible gaseous state is so wonderful as to border upon the miraculous. It will be a long time probably before people generally will be able to see and handle solid air, and the problem now before the chemists is that of rendering it available for all the uses enumerated. Not the least valuable of these will be that of propelling balloons and airships, as is well known, being the weight of all motors up to this time invented, the perfect accumulator doubtless will result from the use of solid air. The motors have been pretty well perfected, and now that a light and almost impendable fuel is available aerial navigation will be greatly accelerated, if not rendered an accomplished thing, within a few months or years. Again, its greatest value, it is said, lies in the separation of the component elements of common air and liberating for universal use the oxygen it contains, cheap oxygen being held a great desideratum.

But speculation might be continued without limit as to the possibilities of this wonderful agent, which, it is hoped, will unlock the mysteries of the atmosphere and give us a clue to greater discoveries than we have even dreamed of in this world of ours.

WILLIAM J. RUDOLPH.

THE KING AND THE TEA MERCHANT.

A funny story about King Edward VII. and Sir Thomas Lipton is going the rounds. That it need not be believed does not take from its merits. Here it is: The king, after distributing South African medals, said something to Sir Thomas about the new orders which he desired to honor, and by on those of his order may be concluded. "I shall be promptly attended to," is the alleged reply of the great tea merchant.

day or two after the birth of his daughter and, in honor of the event, 20,000 requests for money.

Senator Hoar of Massachusetts spends his vacation in resting. He rises early, but in his bed every night by 8, and during the day takes long walks and does a good deal of light reading.

Alfred Vanderbilt, who is now the head of his family, is one of the best amateur tennis players in New York.

THE STOLEN "MADONNA OF THE ROSARY."



The risk of having historic and valuable paintings lying about where people can pick them up was recently accentuated by the mysterious disappearance of Sassoferrato's famous masterpiece, "The Madonna of the Rosary"—depicted in the accompanying illustration—from the Church of St. Sabina of the Aventine. The Dominican monks who occupy the convent missed the painting on the morning following the visit of an American in a neighboring lane, but the picture has been missing ever since. It need scarcely be said that this picture by Sassoferrato, the great Roman artist of the seventeenth century, who was said to rival even Raphael in delicacy of touch, is invaluable. In consequence of the loss of "The Madonna of the Rosary" and of several other pictures in the last few years, the government is contemplating removing all the more valuable works of art from the religious houses, where they cannot be properly guarded, and placing them in the museums in care of authorized officials.

He is a good racket player, too, and during the winter is an enthusiastic devotee of the latter game.

Wood pulp is now being used in the manufacture of paper of textile fabrics, such as cotton and linen, which are totally insufficient to meet the demand, which is increasing every year.

The United States has about 1,000 mills engaged in the manufacture of paper, mostly from wood pulp. From

these 1,000 mills the United States puts 6,000,000,000 pounds of paper on the market each year.

The railways of America are using today 700,000,000 cross ties, and each year they require 112,000,000 additional cross ties to renew those now in use.

The yearly cash expenditure for cross ties exceeds \$60,000,000, and it is estimated that in the next twenty years 2,000,000,000 ties will be required.

developed, by the cumulative effort of several, if not many, minds working to one end. For example, the first known liquefaction of air by applied chemical processes was made in 1878 by Calliott in Paris and Pictet in Geneva. Two Russians with almost unpronounceable names, Wroblewski and Oleszewski, improved the processes. Demar of England went further than any other chemist in his experimentation and in publishing his results; Linde of Munich added his observations, and in 1898 Charles E. Tripler of New York popu-

larized the discovery in America. It might seem invidious to mention some of those who are identified with the development of the process and not all, but this enumeration is made merely to illustrate the activity with which trained minds seize upon any sign of a new vein or lead that shall possibly unfold to them the hitherto secret mines of wealth in nature's arcanum. The true scientist is broadminded, ready to sacrifice himself in contributing to the world's fund of information, and especially

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climate to order, for a single grain of it will cool a quart of champagne. Even on the equator a person may have the climate of the arctic circle by the proper use of a chunk of air no larger than a lead pencil.

One gallon of liquid air has the cooling capacity or power, it has been computed, of eighty-five pounds of ice, and an equal amount of solid air would be capable of adequately chilling the largest cold storage warehouse in existence. In the purification of chemicals and liquids used in the arts and in do-

my girl of sixteen, who had danced several times with little Alfonso, presented her cheek to him for a salute. Instantly he straightened up and extended his hand to her. "I don't kiss girls," he said. "They kiss my hand instead, I am your king."

The International Society of Arboriculture planted over 2,000,000 trees last year.

The entry of the Grand Duke of Lux-

emburg into his eighty-fifth year seems to call attention to the remarkable development of longevity among reigning princes during the last half century. In July, 1840, there were fifty-one sovereigns, great and small, in Europe, among whom there was but one, the king of Hanover, over seventy years of age. Today there are forty.

The king of Italy received 26,000 telegrams of congratulation on the first

day or two after the birth of his daughter and, in honor of the event, 20,000 requests for money.

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NEWSY TABLOIDS.

The government will next spring distribute throughout the country young trees and seeds to whoever may apply for the same through their members of congress.

Fifty pounds of paper for each individual was the amount consumed in this country last year.

Nearly 25,000,000 pounds of printed

matter, designed for general distribution, was shipped in one month last year.

Wood pulp is now also being used in many parts of France in the manufacture of various cloth fabrics.

Many stories are related of the young king of Spain. At a recent function in which only young people joined a pre-