

# FRUIT FARMS and GOOD ROADS NOW FOLLOW THE GOLD DREDGERS



A MODERN GOLD DREDGE

By Arthur L. Dahl

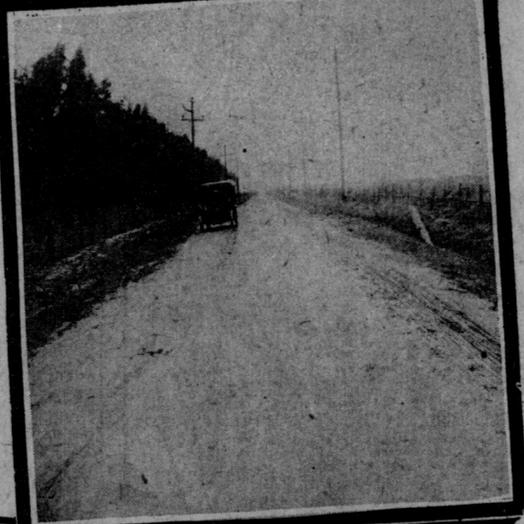
WHEN the cashier of a bank hands you out a little pile of gleaming gold in exchange for the bit of paper you present him, have you ever wondered from what source the material in that money came? Were those glistening gold pieces first brought to light by the sharp pick of some lone prospector who penetrated the wilds in search of yellow nuggets? Were these treasures of nature washed from the gravel along some murmuring mountain stream by some faithful fortune hunter; was the gold separated from its abiding place of centuries by the fearful force of a hydraulic stream, or was it sucked up with the sand and gravel which goes to satisfy the enormous appetite of a modern gold dredger?

It is probable that the rounded discs which spell food and drink and pleasure for you were made from material produced by the last mentioned mining process, for within the last few years the wonderful development in the field of gold dredging has resulted in the production of more than one half of the gold output of California by the dredger process, and over sixty machines are constantly extracting the gold from the beds of some of our streams. This process is supplementing the ordinary production of gold, for by the use of these modern mechanical monsters, the tiniest grains of gold can be extracted from the soil, and gravel which would be too poor to warrant being worked by any other method will produce tidy dividends for the owners of dredging machines. Their use has been the means of adding millions to the existing wealth of the world, and their development has been so great that the dredger of today no more resembles the dredger of yesterday than the modern automobile does the ox cart.

The gold of commerce is scattered throughout all California, from the snowcapped peaks of the Sierras to the burning depths of Death valley. The

streams. Thousands of acres of alluvial soil have thus been deposited to form the wonderfully productive agricultural sections of the valley. In many other places, however, the flood waters left only wide expanses of boulders and cobblestones, which until the last few years were looked upon as practically worthless. But mixed in with the millions of tons of stones and sand were great treasures of gold, too thinly scattered to be reclaimed by any of the old forms of mining. One day an enterprising nurseryman engaged in sinking a well on his ranch along the Feather river noticed that the sand and soil lifted from the well sparkled with grains of gold, and he thereupon turned his attention to devising a plan for extracting it at a profit. The dredger method resulted, crude and unsatisfactory at first, but involving the right principle.

That man was W. P. Hammon, commonly called the "dredger king." Dredging has made him very wealthy, and he in return has developed an industry that

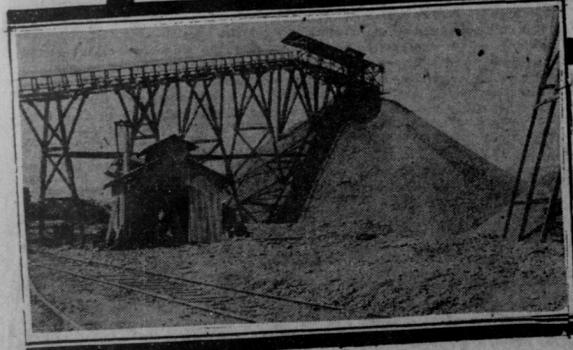


A ROADBED CONSTRUCTED WITH CRUSHED DREDGE TAILINGS



ORANGE GROVE THRIVING ON LAND THAT HAS BEEN DREDGED

CRUSHED ROCK FROM A DREDGER



operations of the gold ships have been confined principally to a few localities in the Sacramento valley, although this process is coming into vogue in other sections of the state. There are dredgers today on the Mokelumne, Calaveras and Tuolumne and there is one in Siskiyou, besides the central colonies on the Yuba, American and Feather rivers. The Guggenheims have two just starting on the Klondike to add to the formidable fleet already in Alaska, and one building at Marysville is destined for the Magdalena, in Columbia.

The rivers of the Sacramento valley have always been subject to overflow during the winter months. In flood periods vast amounts of silt and debris have been carried down from the mountains and deposited along the beds of

produces millions each year from formerly worthless washes, and, incidentally, has solved the problem of reclaiming these waste places for agriculture. The present day dredger is a monster affair. The development of electric power has contributed largely to the success of these machines, for they require the mighty power generated from the falling waters of the mountains to keep whirling and whirling the combination of buckets, cogs and rifles of which they are composed.

A modern dredger costs a small fortune and is composed of massive but intricate machinery. There are 68 buckets on the endless belt which dig down, and each bucket weighs about two tons, a total weight in empty buckets alone of 134,000 pounds. Each

of these buckets will hold 1 1/2 cubic feet of earth. The average empty dredge weighs complete over 2,000,000 pounds. One of the post to which the dredger is lashed while at work weighs over 17,000 pounds. It is of solid steel. A big machine of this sort will scoop out 10,000 cubic yards in a 24 hour day—all dredges work night and day. During August of last year the record dredge on the Yuba river handled 309,000 cubic yards. In the argonaut days it kept a placer miner busy to handle four cubic yards. One dredge of the present is doing, therefore, the work of 2,500 miners of '49, and as there are over 60 dredgers in the California field their combined work equals that of an army of 150,000 pick and shovel miners.

The method of operation is very simple. The earth down to bedrock is scooped up by the buckets and deposited on revolving screens; it is washed and the finer particles drop through the screen on to plates, where the gold is caught by quicksilver, thus forming an amalgam. The debris is washed away while the cobbles and larger stones are carried directly from the screen to what is known as the "stacker," and by the stacker they are carried to the rear of the boat and piled in great heaps.

Following the history of all mining, the present gold dredging districts are bound to work themselves out when the gold bearing gravel is exhausted. Knowing this, one of the largest of

the companies conceived the idea of creating a new industry by crushing the hard granite tailings left by the dredgers and selling the product for road making and other purposes. At first, difficulty was encountered in crushing the cobbles, owing to their extreme hardness and rounded condition, but this was overcome by designing special crushers for the plants. The crushed stone was found especially suitable for railroad ballast and macadam for highways, and the new industry has grown to large proportions, employing hundreds of men. The plants, of which there are three, have each a capacity of from 1,500 tons to 3,000 tons per day. They are located on the barren wastes left by the dredgers and the cheapness of handling has enabled the selling of the product at so moderate a figure that an impetus has been given the good roads movement in the Sacramento valley, and miles of splendid roads are being built with the dredge tailings.

With the clearing of the dredged areas through the removal of the cobblestones for the crushers, another industry has grown up, for the dredging men found that eucalyptus and other trees would thrive and wax strong in the dredged washes. Thousands of trees have been set out, most of which are growing successfully, and at the recent state fair at Sacramento numerous varieties of fruit were exhibited from trees growing on abandoned dredging lands. Grapes will also grow on land of this character, and the showing thus far made has been so encouraging that plans have been made on a large scale to reclaim thousands of acres for agricultural purposes, and the years to come will see groves of eucalyptus, orchards and vineyards covering now barren wastes.



## CALIFORNIA OIL — QUEEN OF THE NAVY'S FUTURE FUEL

By Arthur H. Dutton

UNCLE SAM is to have an oil burning navy. It has taken him many years to reach this determination, but determined he now is that not only his torpedo craft but his largest vessels are to substitute oil for coal, either wholly or in part, as a fuel.

It has recently been announced by Rear Admiral Hutch I. Cone, engineer in chief of the navy, and the same Hutch I. Cone who as lieutenant, commanded the destroyer flotilla that accompanied the battleship fleet to the Pacific coast in 1908, that the two big dreadnoughts authorized by the sixty-first congress this year are to be oil burners. This fact has been definitely settled concerning these monsters, although other details concerning them are still uncertain, save those of armament and size. They are to be the largest and most heavily armed warships ever built or even designed for this nation or any other.

Twenty-one of the destroyers already built or building for the United States navy are oil burners, and all others in the future are also to use oil as a fuel. The dreadnoughts Delaware and North Dakota, now in commission, and the Arkansas, Florida, Utah, Wyoming and New York and Texas, now under construction, are so fitted that they may use either oil or coal. All future ones will burn oil alone.

This is of the greatest significance to California, which now leads all the states of the union in the production of fuel oil. It means that an immense market is now open to California oil producers. It also means that the navy department recognizes the fact that the future scene of our navy's greatest activities is to be the Pacific coast, with California as the fuel base.

It was at the meeting of the Navy League of the United States, held in March in Los Angeles, that Admiral Cone made his announcement in unmistakable language. "We are at present," said he, "designing ships which will be particularly effective in the Pacific because of our large supply of fuel oil on the west coast. So far as can be seen at the present time, the United States navy of the future will consume oil instead of coal. In fact, we have already in commission 10 destroyers which burn nothing but oil. Battleships being designed for the next year's program are to be vessels that burn oil only. In order that you may be informed of the situation with regard to oil burning, which I consider the most important technical question now confronting the department, I will state briefly the reasons which caused this decision to burn oil.

The advantages of oil over coal are that a smaller weight of oil is necessary to produce the same power. It can also be taken on board ship readily without manual power and without interruption to the routine of the ship. The problem of fueling at sea is solved. Full power in such vessels can be maintained at a low power, and a vessel burning oil is capable of prolonged runs at full speed without fatigue on the part of the personnel. Oil can be burned smokeless, which is, of course, an important tactical consideration.

With oil as a fuel a considerable reduction in personnel is possible. Coal and ash handling gear is eliminated, rendering unnecessary the piercing of the hull for coal trunks. The storage and handling of oil is much easier than that of coal and will result in a cleaner ship, with consequent increase of time available for training and drills. The mechanical supply of oil fuel to the boilers gives a prompt and delicate control of the steam supply and permits more sudden changes in speed than with coal. This is a decided tactical advantage.

Admiral Cone gave other convincing reasons for the adoption of oil in place of coal and made it perfectly clear, likewise, that the decision removed the

oft repeated objection made to maintaining the fleet in the Pacific—where it is most needed—namely, that it was too remote from an adequate fuel supply. With California oil fields at hand, the fuel problem is solved. California not only produces more oil than any other state in the union, but the oil is within ready reach from the sea. It follows from the change from coal to oil as a fuel that the naval oilers will henceforth be tank steamers. They will, of course, be capable of carrying coal, but they will be specially adapted to carry great quantities of fuel oil. At the present coaling stations oil depots will be established, at which great quantities of oil will be kept in storage. California City, Pearl Harbor, Guam, Tutulia, the Philippines, Panama and other naval stations will be oil depots, drawing their supplies from California oil fields.

The navy department has been extremely slow in reaching its determination to adopt oil as a fuel. For more than 40 years the department has been considering the matter, but an extraordinary conservatism has until recently made it hesitate about taking the important step. While the merchant marine was quick to see and appreciate the advantages of oil fuel and quick to avail itself of it, the navy held back until after nearly every steamship regularly plying the Pacific waters had been built, and the navy department was compelled to abandon its conservative position, and the adoption of oil as a fuel began with some destroyers built about three years ago. They were eminently successful, so successful, in fact, that all destroyers built since have been made oil burners. The results were so gratifying that the navy department was compelled to build or building are the following:

displacement of 32,000 tons, the same as the Brazilian Rio de Janeiro, at present the largest warship yet designed by any nation. But this is not startling, as merchant steamers are now built with full load displacements of more than 50,000 tons.

These 15 14 inch guns would give the new ships the heaviest battery of any yet contemplated anywhere. The Rio de Janeiro carries but 12 14 inch guns, or two more than the New York and the Texas, now building, which are of 27,500 tons displacement. Besides the main batteries of big 12, 13 or 14 inch guns that modern battleships carry, they likewise have lesser batteries of smaller guns for defense against torpedo attack, for close fighting and for use against exposed bodies of troops on shore. In their main batteries, the Arkansas and the Wyoming have 12 12 inch guns and the New York and Texas ten 14 inch guns. In their secondary batteries, each of these four vessels carries 21 five inch rapid fire guns. The two new unnamed ones are to carry a few more five inch guns.

With 15 14 inch guns, the broadside of one of the new dreadnoughts would throw, at a single discharge, about 10 tons of shells. The British navy now has 23 dreadnoughts built or building. Of these, nine like the Lion, have but eight big guns in their main batteries, but they have speeds from 26 to 28 knots, which has earned for them the title "battle cruisers." The great 12 gun battleships now being built by the United States, Brazil, Germany, France, Argentina and Japan are now called "super dreadnoughts," owing to their great increase of power over the first British Dreadnought, which started the vogue in these monster warships.

Germany has 17 dreadnoughts built or building, France 12, Brazil 5, Japan 4, Argentina 2, Russia 4 and Italy 4. Austria is said to have made preparations for two or three dreadnoughts. The United States has 10 built, building or authorized.

The prodigious weight of metal that can be thrown by a single broadside discharge of these "super dreadnoughts" is shown by the accompanying table:

WEIGHTS OF METAL DISCHARGED AT ONE BROADSIDE

Name	Nationality	Weight (lbs.)
New ships (16 guns)	American	21,900
New York	American	14,000
Arkansas	American	11,640
Delaware	American	9,120
Orion	British	12,965
Lion	British	10,434
Rio de Janeiro	Brazilian	17,117
Helgoland	German	8,800
Moltre	French	10,850
Invencible	Argentine	10,998
New ships	Japanese	9,423

It is pertinent to observe here that a single round of ammunition from a 14 inch gun costs \$600 and from a 12 inch gun \$424.

The first dreadnought of any nation to sail in the Pacific ocean was the American Delaware, which recently made a trip from the Atlantic coast to Valparaiso, Chile, bearing the body of the Chilean minister, who died last winter in this country. The Delaware has since returned, owing to the Atlantic rejoin the battleship fleet for the summer maneuvers.

But the Delaware and others of these great warships are destined to visit the Pacific coast in the not far distant future, and they will probably stay there, now that the difficulty of keeping them properly supplied with fuel has been removed by the adoption of oil for the navy in connection with or in place of coal. No more will the shameful exhibition be made of having our fleet accompanied from ocean to ocean by foreign colliers, as was the case with Admiral Evans' battleship fleet in 1908, for California is at hand with millions of tons of fuel oil ready for delivery.

The adoption of oil as the navy's fuel of the future marks an epoch in the military and commercial history of the nation, and particularly of California and the west.