

The 'Union' Engine.

The accompanying illustration depicts a large American four-masted schooner equipped with twin-screw Union 3-cylinder engines of a total of 300 h.p. running on crude oil, and a 4-h.p. electric light engine. The length of this vessel is 167ft., beam 40 ft., depth 13 ft. 4in., tonnage 567, with carrying capacity of 800,000 square feet of timber. It is well to remember that New Zealand took the lead in the Southern Hemisphere in adopting the oil engine as a motive power for such vessels. The large expanse of smooth water in the Hauraki Gulf, and elsewhere in the Dominion makes this engine an ideal type for marine propulsion for trading vessels of all sizes, as it requires only a minimum of attention, and, on account of the few working parts, a small bill for repairs.

The Panama Canal.

PROGRESS OF THE WORK.

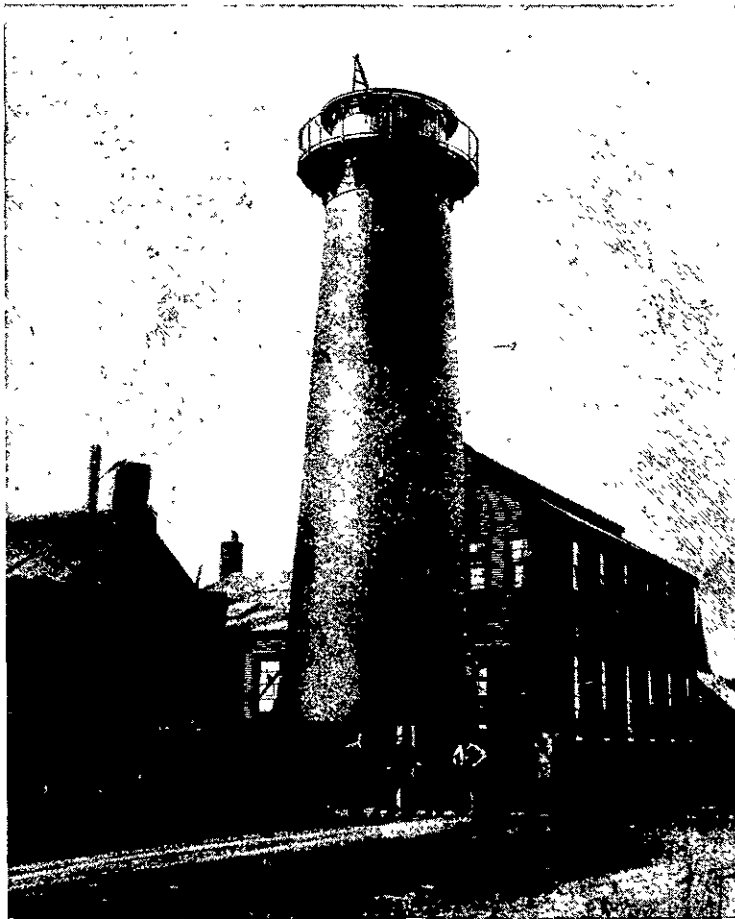
Since the American Government took the direction out of the hands of the civil engineers and placed it in those of the military engineers of the United States Army, the work has proceeded apace. It is now an old story how the first got to work after the way had been opened by the admirable arrangements of the sanitary authorities who had, by working what were universally regarded as almost miracles, made the Isthmus of Panama habitable and wholesome. Congress voted steadily millions of dollars a year, and men began to look for the work to get into shape. A vivid controversy was got up about the old question of locks *versus* a sea level. It raged with an accompaniment of denunciation and prophecy of evil, seldom equalled in intensity outside of America, and it died out and apparently was forgotten. The advocates of the level canal were, it is well to remember, for a reason that will presently appear, really advocates of the French plans, to the superiority of which they testified strongly.

As work went on it was found that the original conclusions as to the formation of the isthmus were more than confirmed, the ground proving more solid than anticipated, and the great river Chagres, the bugbear of former critics, a much maligned water power. The Gatun dam, projected for the control of this turbulent stream, was by the critics of the profession, or some of them, declared impossible, and the great Culebra cut a myth of the most colossal magnitude. The plain English of these criticisms was, "You can not get through the mountain divide, and you will never build the Gatun dam, but if you do the river will carry it away every time." If was added with a certain amount of glee that the work from the outset was subject to unexpected delays, thus falling behind the estimated time more and more.

To this it was replied on behalf of the constructors that there was no delay really; only a rather longer preparation for the actual work of construction than

demands. They wanted too much *carte blanche*, and they could not get into the system of checks required, very properly, by every undertaking in which public money is expended—checks, which, we may add, are more necessary in the United States

now upon work at Gatun, rather than upon the work of excavation, which has hitherto been generally taken as the determining feature. The progress in this direction has been faster than anticipated and the appropriation made at the last session of



THE NEW CAPE CAMPBELL LIGHTHOUSE IN THE YARD OF THE BUILDERS (CHAS. JUDD, THAMES). HEIGHT 65 FEET.

than anywhere else. The event has proved the critics wrong, at all events, as to the delay. Instead of delay, there has been a great bettering of the rate of progress, so that the Isthmian Canal Commission has asked for permission to spend eight million dollars this year more than the appropriations voted by Congress.

The Isthmian Canal Commission makes the public statement that with the present fine organisation and at the present rate of progress, the canal can be completed more rapidly than by restraining expenditure within the appropriations which were made at the last session of Congress to continue the work

Congress would not be sufficient to supply the necessary plant to begin laying the concrete in the locks and dams during the next fiscal year, although progress already made indicates that such a beginning is advisable. In order to avoid reducing the force to keep within the expenditure already authorised for this fiscal year, the chairman of the Commission has recommended to the Secretary of War that the work be allowed to proceed, and that Congress be appealed to at its next session to make good any deficiency in the funds now available.

That is a fact rearing a hard head out of the chaos of hostile oburgation and predictions. Instead of delays there is unexpected rapid progress. The Gatun dam moreover, is not only proving easy of construction and safe, but by reason of the enormous increased area (170 square miles is the latest calculation) of the lake it will prove a splendid controller of the wild river that was supposed to threaten the life of the enterprise. As for the Culebra cut, it is being pushed through with a smoothness which astonishes every engineer who looks into the matter.

A recent observer says that the work on the locks has now progressed to a point at which it is possible to see something of their forms. The present indications are that the excavation will be far enough completed in about eighteen months to enable the masonry work to be put in hand. Material is being rapidly dumped on the site of the big dam; the Chagres has been diverted and dammed; and the Commission reports that suitable sand and rock for the big masonry rocks have been located, as also material for the manufacture of all the cement that may be required. It is, of course, hoped that the necessary cement may be obtained in the ordinary way at reasonable prices. But in that country of "trusts" and "corners" it is just as well that the Commission can face the position with a certainty of being able to rely upon its own resources.

A Vindication of De Lesseps.

It has been the custom to regard the old machinery left behind by the French company which failed to construct the canal as in every way bad, in design, workmanship, and efficiency. Hundreds have seen the rusting piles of scrap-iron lying in melancholy profusion all along the line of the old workings, only to condemn them unequivocally. There was a vast quantity, and the asset was considered too small to be counted of any value at all.



AMERICAN SCHOONER WITH 300 H.P. UNION THREE-CYLINDER ENGINES.

was at first estimated. When the civil engineers retired and the Government replaced them with their own staff selected from the U.S. Army, the critics pronounced the event to be a confirmation of their worst predictions. The Government side replied that the civil engineers had been too exacting in their

until 1908. The work on the locks and dams on each terminus has been opened, and will be pushed vigorously during the year, while very little was expended at those places during the fiscal year which terminated June 30, 1907. The time of completion of the canal, says the Commission, appears to depend