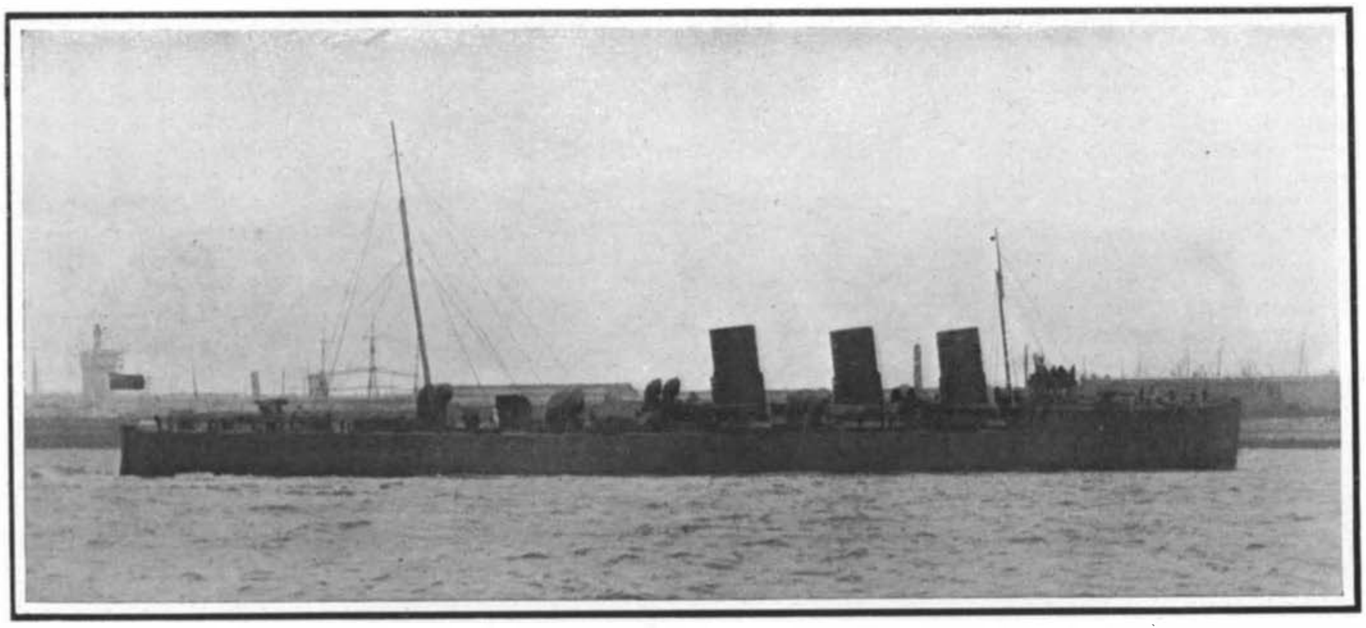
THE BRITISH 38-KNOT DESTROYER "SWIFT."

The question of warship speed has been occupying a good deal of attention lately, and general interest in the subject has been considerably quickened by the performance of the United States cruisers of the "Chester" class and of the British "Indomitable." There have been many assertions made as to what ship is entitled to bear the distinction of being the fastest warship in the world; and although such discussions have as a rule been confined to vessels of good sea-going and sea-keeping qualities, the question in its wider bearings has been answered very emphatically by the British special-type torpedo-boat destroyer "Swift." On her preliminary trials this vessel maintained for some hours a speed of 38.3 knots or nearly 45 miles an hour—higher by three knots than the best four-hour performance ever achieved; and by modifying the propellers it may be possible to get a higher speed out of her.

The "Swift" was laid down in October, 1906, at the works of Messrs. Cammell, Laird & Co. at Birkenhead, and was built to the designs of the builders, modified and improved by Sir Philip Watts, the director of British naval construction. Her displacement is exactly double that of the largest torpedo-boat destroyers previously built, namely, 1,800 tons; while her length of 345 feet falls short by only 36 inches of the length of the 10,300-ton United States battleship "Indiana." Her beam is 34 feet 2 inches—slightly less than one-tenth of the length—and the mean draft is 10 feet 6 inches.

The "Swift" is, like all recent British ships, fitted with turbine engines on the Parsons principle, designed to develop the stupendous horse-power, for her size, of 30,000, and to give a speed of 36 knots. The turbines are in two compartments, and drive four shafts with one propeller on each. The furnaces are fitted for the burning of oil fuel only, the carrying capacity being 180 tons; and it is the subject of considerable comment that this is no greater than the quantity carried by the 800-ton 33-knot destroyers of the "Tartar" class, which immediately preceded her. The armament of the "Swift" is limited to four 4-inch (25-pounder) rapid-fire guns and two 18-inch torpedo-tubes.



Length, 345 Feet; Beam, 34 Feet 2 Inches; Mean Draft, 10½ Feet; Displacement, 1,800 Tons; Horse-Power, 30,000; Builders' Trial Speed, 38.3 Knots.

THIRTY-EIGHT KNOT OCEAN DESTROYER "SWIFT," THE FASTEST VESSEL AFLOAT.

After her speed, the most remarkable feature of the "Swift" is her cost. This amounts, in the case of the hull and machinery, to $1,237,310 and to $14,150 for the armament, a total of $1,251,460. This is a huge price to pay for a vessel of only 1,800 tons and practically without any fighting power, and may be profitably compared with the figures given below for typical cruisers and similar war vessels in the British and in the United States navies.

The greater part of the cost of the "Swift" is, of course, absorbed by her speed; and in this connection it may be interesting to note that if the "Indomitable" had been designed for 23 knots instead of 25, it is estimated that she would have cost $1,500,000 less than she actually did; and that if the "Dreadnought" had been designed for 18.5 knots instead of 21, she would have cost $2,150,000 less. Since Great Britain has four "Indomitables" and eight "Dreadnoughts" built, building, or projected, the total saving would have been no less than $24,000,000—sufficient to build another three battleships.

It is not known whether the British Admiralty intend to repeat the "Swift," but it is regarded as very improbable. At a time when it is so difficult to get money from the government for purposes of national defense, it is likely that the Admiralty will find some more substantial way of spending money than in the creation of speeds which, however startling, have but a very limited military value.

Ship.	Type.	Displacement. (normal)	Speed (nominal)	Armament.	Cost.
Swift (Br.).	Destroyer	1,800 tons	36 knots	Four 4-in.	$1,251,460
Adventure (Br.)	Scout	2,940 tons	25 knots	Ten 3-in.	1,142,130
Amethyst (Br.)	Cruiser	3,000 tons	23 knots	Twelve 4-in	1,142,130
Chester (U. S.)	Scout	3,750 tons	26 knots	Two 5-in. Six 3-in.	1,625,000*

* Exclusive of armament.

THE MARI-KANAVÈ DAM IN SOUTHERN INDIA.

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

Recently an interesting water-impounding scheme has been carried to successful completion in Southern India, at the Mari-Kanavè gorge upon the Vedarati River, in Mysore State. Land cultivation in the area abounding the river has hitherto been severely handicapped from the shortness of the rainfall, while the river, unlike those in the northwestern states, receives no reinforcement in its volume from melting snows upon the highlands. The result has been that the agricultural development of the country has been neglected in favor of other parts of the country where the natural watering facilities have been supplemented by a vast network of irrigation channels and canals. Such a state of affairs has adversely affected the revenue coffers and prosperity of the state. The deficiency was realized about a century back and the scheme was advocated of constructing a barrage in the Mari-Kanavè Gorge at the point where the opposite mountain spurs converge, leaving only a narrow passage for the course of the river. For over three-quarters of a century the project was discussed but nothing was attempted in the matter until 1898, when requisite designs were prepared. The plans showed that the scheme could easily be consummated and furthermore at practically little expense. Accordingly official sanction to the scheme was obtained and constructional work commenced in the fall of the same year, and carried on incessantly until its completion a few months ago.

This irrigation scheme is of a "protective" and not of a "productive" nature; that is to say, it is only intended to act as an insurance upon the crops grown in the Chitaldroog district where famine is occasionally experienced. At the present time it is only intended to supply water for some 25,000 acres, but in the near future it may be found advantageous to increase this area when it is ascertained what the catchment area, which is 2,075 square miles in extent and contains several tanks, will yield. The lake that has been formed by throwing the barrage across the mouth of the gorge is one of the largest artificial sheets of water in the world, having an area of 34 square miles and containing 31,000,000,000 cubic feet of water, when filled to its maximum capacity, when there is a depth of 130 feet of water on the up-stream face of the structure.

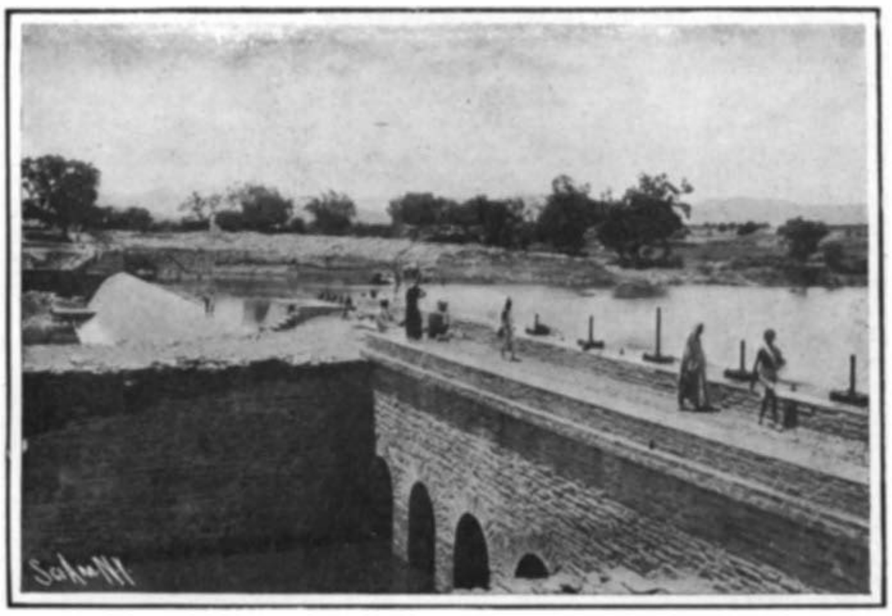
The general design of the barrage may be gathered from the accompanying illustrations. At the point where it is built between the jutting crests of the mountain range on either side the neck of the gorge is about 1,250 feet in width at the level of the roadway of the barrage, in a straight line; but the dam does not extend in a direct line, the slight deviation being necessary to secure the fullest advantage of the hard rock course for the foundations.

The barrage is built throughout of rubble masonry. At roadway level it is 1,350 feet in length, and 142 feet above the bed of the river, while the foundations are carried down to a further depth of 25 feet. At the toe the masonry is 150 feet in thickness, tapering to 15 feet at river level (119 feet) whence it rises perpendicularly to the top. Altogether 6,000,000 cubic feet of masonry have been worked into its construction and under the present head of 110 feet it is practically water-tight.

The barrage was constructed exclusively by native labor, and considering its dimensions it is probably one of the cheapest structures of its character that has ever been built, the dam itself costing only $675,000. But little inconvenience or interruption in building was created by the river from the simple fact that for four months in the year it runs very low. In the monsoon seasons the floods were discharged over a temporary weir formed by retaining a section of the dam at a lower level for this express purpose. In view of the fact that it is very probable that water will be required in the near future for electrical purposes, owing to the discoveries of promising gold-bearing ground within 18 miles of the dam, while vast quantities of manganese ore exist in the surrounding hills, it was found necessary to place the out-fall sluices at a height of 60 feet above the river bed in order to secure the requisite head of water for such a hydro-electric project. The water falls from these sluices into the river bed downstream, where it is picked up again by a small dam five miles lower down, where the head sluices are placed and whence the irrigation canals commence. In this manner from 60 to 130 feet of water is rendered available for a 1,000-horse-power hydro-electric station. Although by placing the sluices in the main dam, which are of the Stoney patent type, at a height of 60 feet entails a certain loss of water, such is practically insignificant, since the capacity below this level is only six per cent of the whole.

When constructional work was in full swing over 5,000 natives were employed, and the undertaking offered a novel and interesting example of the cheapness of manual labor as compared with the mechanical appliances. In India there exists a class of laborers generically described as "nowgunnies," or professional stone carriers, who owing to their capacity for hard work are in great demand for such enterprises as this. They are of powerful physique and possess considerable stamina. They will work for ten hours a day and transport from 70 to 150 pounds of stone per man. They form gangs according to the character of the work in hand ranging from 2, 4, 8, 12, to 16 men per unit. How they handle the largest stones may be gathered from the accompanying illustration, and although such transport seems somewhat slow in comparison with the possibilities of handling plants, yet they prosecute their task very energetically, and the scale of pay ranging from 10 to 16 cents per man per day is so low as to render such labor far cheaper than mechanical transport. Indeed, a complete installation of the latter was laid down, a cable being stretched across the gorge over the site bringing the stone direct from the quarries on the hill sides to the site ready for setting; but this had to be abandoned owing to its being far more expensive than the "nowgunny" labor. These men carried the masonry from the end of the railroad track connecting the site of the barrage with the quarries to its destination, and placed it in position. The stone is hematite quartzite.

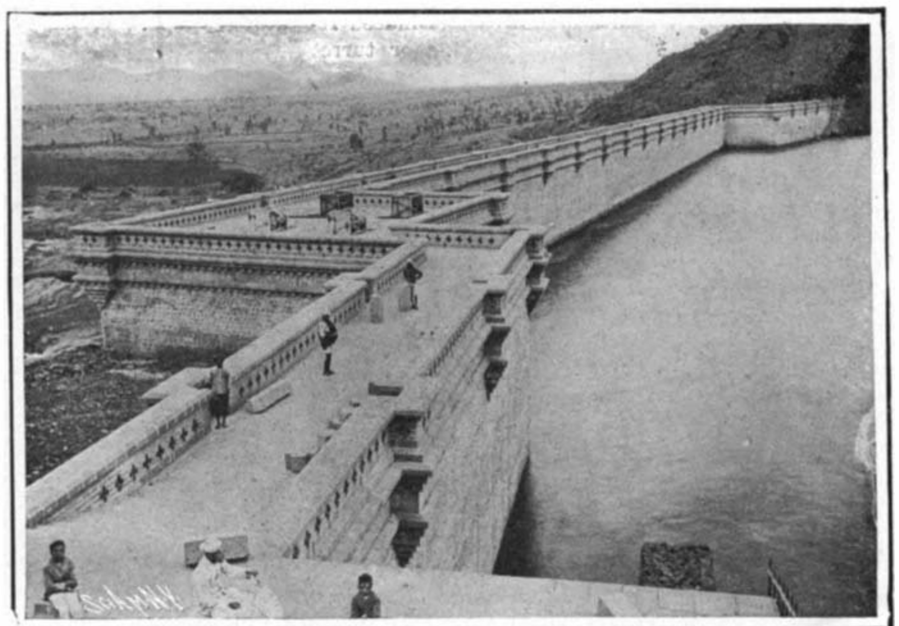
In the formation of the lake thirty-two villages and farms were submerged, the owners being reinstated on other suitable sites or compensated in money. Among the subsidiary works the most important is an aqueduct 3,000 feet in length built in solid masonry and carried on arches. The irrigation channels radiate on either side of the river from the "anicut" or weir, five miles below the main barrage, for several miles, feeding in turn numerous smaller branch channels. The main canals are 32 feet in width at the water level, tapering with 1 to 1 slopes to 20 feet at the bottom, and carrying a depth of 6 feet of water. Although the maximum depth of the lake is 130 feet on the up-stream side, it is only being filled to 110 feet at present, this being ample for existing necessities. The toal cost of the undertaking has been $1,650,000, of which the barrage itself represents $675,000, and the channels $412,500. Precisely what benefits it will bestow upon the surrounding country may be gathered from the fact that the land was formerly assessed at only 3 cents per acre in many instances. By supplementing the natural rainfall, which is only about 16 inches per year, with water from the lake formed by the barrage, and rendering it possible to raise rice, sugar-cane, tobacco, and other equally profitable crops, the assessment including sufficient water supply for two crops has been increased to $1.30 per acre. That it will result in the land being converted from its existing state of barren sterility to a flourishing agricultural district is already being amply demonstrated.



The Left Bank Sluices at the Distributing "Anicut."

The "Anicut" Five Miles Below the Main Dam.

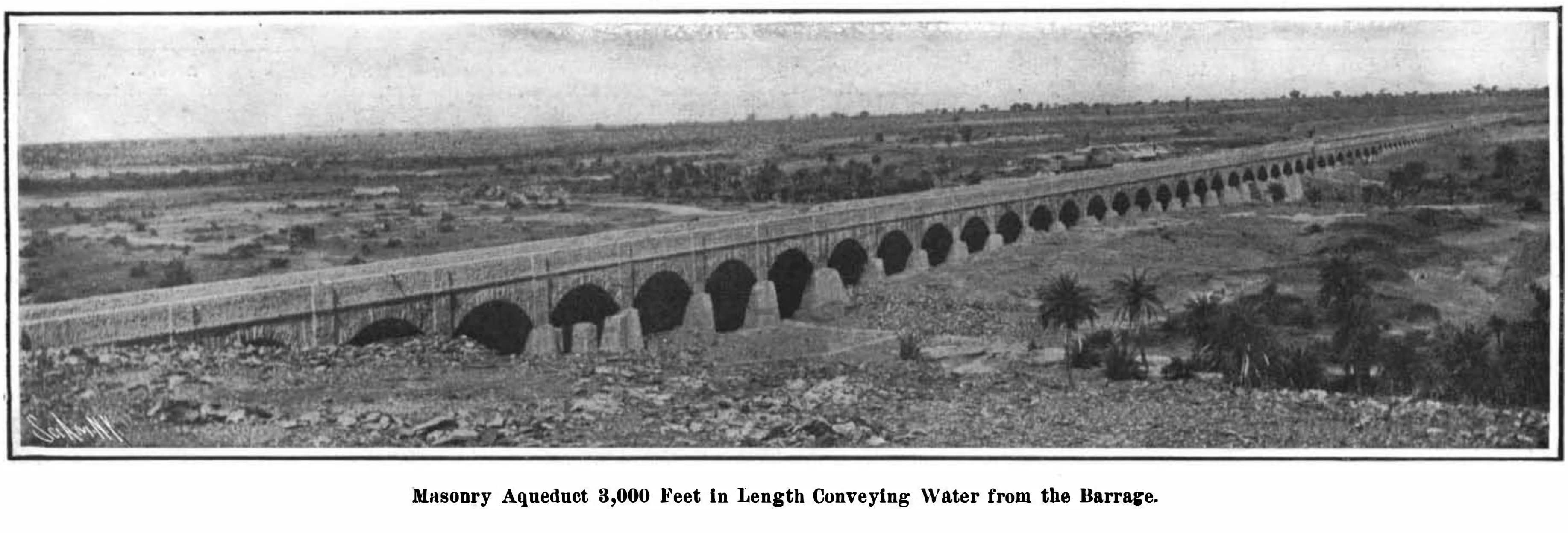
A 28-Foot Cut Through Rock on the Right Bank Distributing Channel.



The Mari-Kanave Dam, 1,350 Feet Long. Maximum Depth of Water, 130 Feet.

Section of Right Bank, Main Channel 30 Feet Wide at Water Level by 20 Feet at Bottom, Carrying Six Feet of Water.

View of the Country Submerged by the Impounded Water of the Vedarati River.



Masonry Aqueduct 3,000 Feet in Length Conveying Water from the Barrage.

THE MARI-KANAVÈ DAM IN SOUTHERN INDIA.