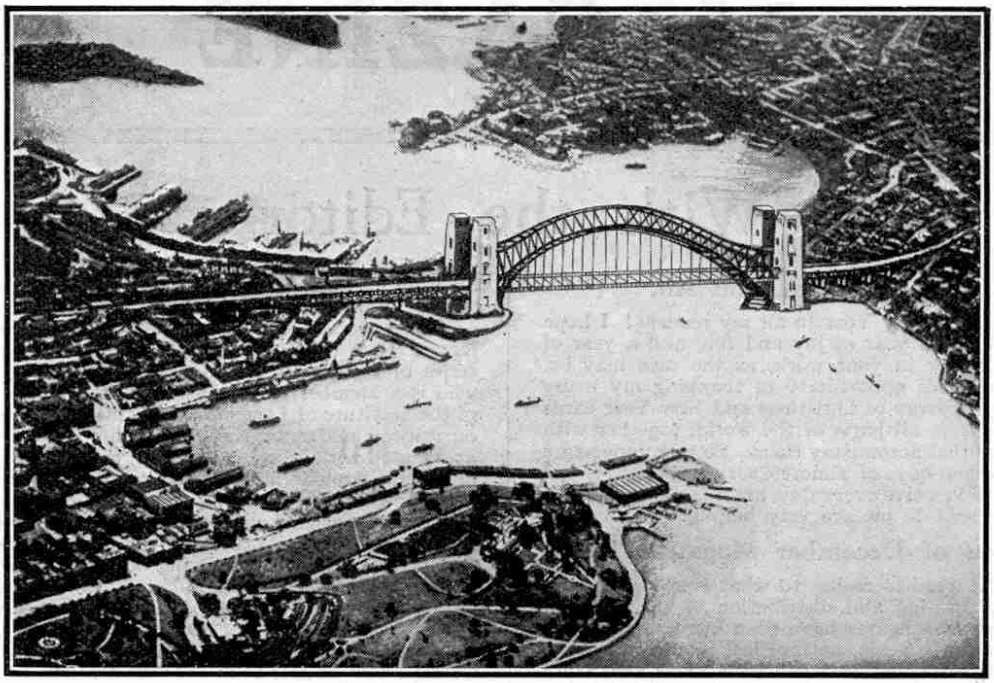
Largest Arch Bridge in the World

Over 50,000 Tons of Steel to Span Sydney Harbour

LAST month we related how the proposals for the Sydney Harbour Bridge gradually developed into a definite scheme, and we described the bridge in detail. This month we deal with the problems involved in its construction and of the difficulties with which bridge-builders have to contend.



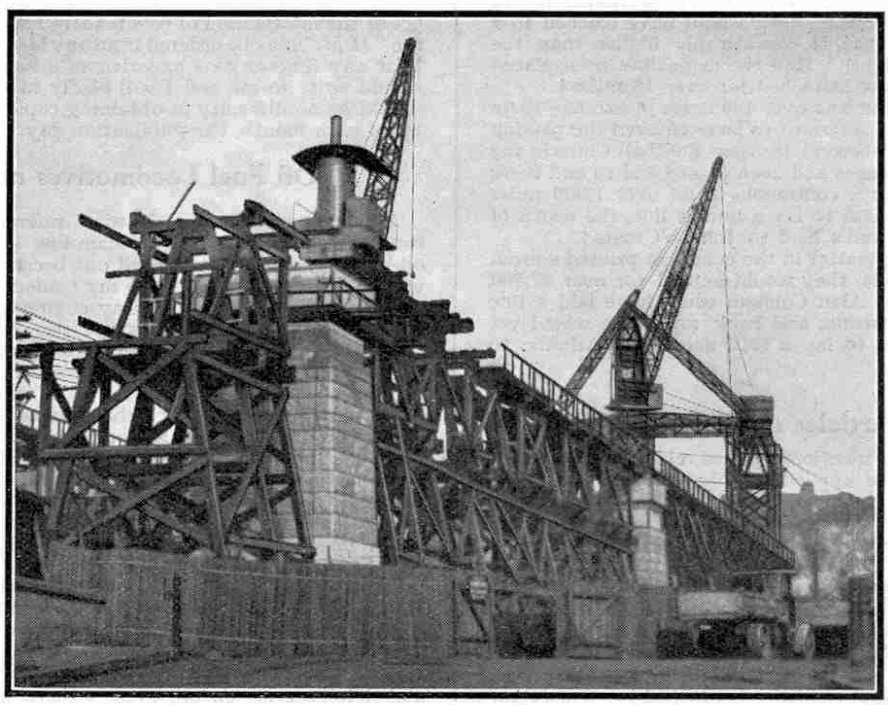
A composite drawing showing aerial view of the bridge as it will appear when completed

The erection of any bridge—and especially of such a huge structure as that which is to span Sydney Harbour—calls for the highest skill and engineering knowledge. Nothing can be left to chance, for the loss of hundreds of lives and of vast sums of public money might be the result of the slightest error in calculation. For years, therefore, work has been going on, on paper, in respect of this bridge, and calculations of strains and stresses, of the resistance of metals, and a hundred and one other things. Every small part has been fitted into position in theory. The place of every rivet and every bolt has been determined, and a legion of draughtsmen have been and still are at work on the detailed plans—the "blue-prints" of the engineering world.

Not the least of the many problems that confront the builder of bridges is the strength of his materials. A faulty girder or a badly cast truss may spell disaster or at least the ruin of many months of work, and consequently the most rigorous tests are applied, in a manner that will be described shortly.

Enormous Strains and Stresses

The Sydney Harbour Bridge will be called upon to resist enormous strains and stresses. Apart from its own tremendous weight of more than 50,300 tons, it will have to withstand the constant force of the wind and in a gale of hurricane violence the strain from this cause alone will be terrific. Quite apart from such outside causes as this, a tremendous strain will be imposed by the ordinary day's work of the bridge. The structure is designed to carry 160 trains, 6,000 vehicles and 40,000 foot passengers per hour and it is calculated that with a full load the deflection at the centre of the bridge will be $4\frac{1}{2}$ inches.



This photograph shows the progress made on the southern approach

The greatest pressure that each of the steel bearings—there will be two at each end—will have to carry will be 40,190,000 lb. Of this tremendous stress 73 per cent. will be due to the