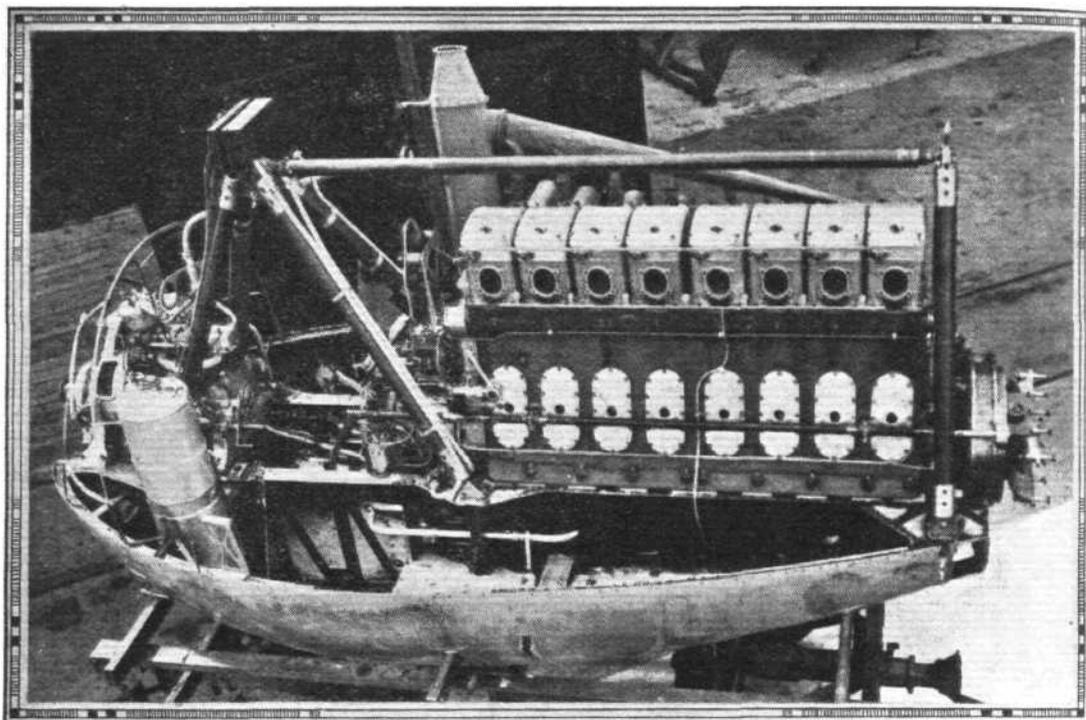


research work. This took the form partly of model tests in the wind tunnels, and partly full-scale work with the old airship R.33, which was equipped for pressure-plotting experiments. The regrettable accident to the airship R.38, which resulted in the loss of many valuable lives, was due to an insufficient knowledge of the aerodynamic forces to which an airship might be subjected under certain manœuvres,

and obviously it was essential, before starting to build airships twice as large, to learn as much as possible about these forces. With this object in view R.33 was re-commissioned and carried out a series of tests. The breaking away of that airship from its mooring mast at Pulham and the damage she sustained, did not materially affect these experiments, from which much valuable information was gained.

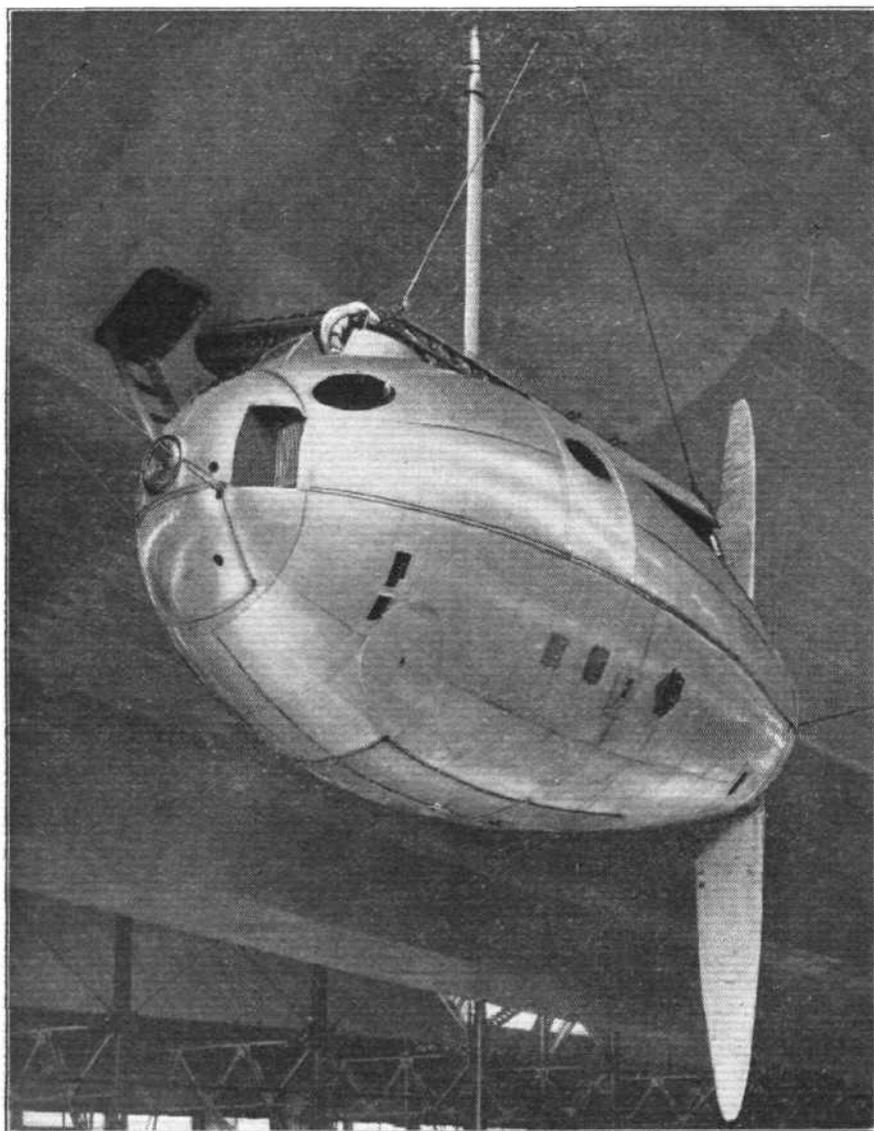
**R.101:** One of the engine cars, with cowling removed. The engine is a Beardmore "Tornado" heavy-oil compression-ignition engine. ("FLIGHT" Photo.)

*Photo.*



**R.101:** The port forward engine car will, until variable-pitch propellers are fitted, be used for reversing only, the propeller being designed to give rearward thrust. ("FLIGHT" Photo.)

*Photo.*



In the wind tunnels at the N.P.L. at Teddington experiments on models were carried out, and the results compared with those obtained from the full-scale tests with R.33. There had been some doubt in the minds of designers concerning the degree to which model test results could be depended upon to represent full-scale conditions, but the tests showed definitely that the model tests can be regarded as substantially accurate for full-scale prediction.

On the practical side experiments were made at Cardington, a complete full-size section of R.101 having been built and tested so as to provide a check on the calculations of the designers. When that had been done, and not until then, the actual form which R.101 was to take was definitely decided upon. Afterwards, whenever in the course of developing structural details, any doubt existed or insufficient information was available, tests were carried out to settle the matter. This policy was the cause of many delays, but as the airship is now to be "on trial for its life" so to speak, it was imperative that nothing be left to chance or to guess-work. The airships are some two years late in making their appearance, but the time spent in making sure of every detail should not be begrudged, if in this way we have succeeded in making as sure as is humanly possible that, if the new airships are on the heavy side as regards structure weight, they shall at any rate be amply strong for their work.

By way of actual example, it may be mentioned that special forms of electrical strain gauges were developed, which make it possible to measure the stresses in any part of the structure. These gauges were used on the test bay, and will also be fitted in large numbers during the test flights, so that the stresses set up in various manœuvres will be recorded.

In connection with the design and construction of R.101, it should be