From the outset the Gyron Gynorm was developed for operation with reheat. An early version of the afterburner assembly is here seen on its journey from the Engineering Division at Stag Lane to the test bed at Leavesden. Subsequent development work enabled some reduction to be made on the weight of this interesting component.

The Gyron Gynorm

First details of a new jet turbine designed specifically to be the most powerful in the world. 240,000 lb. (108,860 Kg.) static thrust without reheat.

THAT it has always been the policy of the de Havilland Engine Company to strive to foresee the future propulsive requirements of a rapidly progressing aircraft industry has been stated frequently — some might think too frequently — in the *Enterprise*.

It is well known that the Gyron and Gyron Junior turbojets and the Spectre series of rocket engines are examples of such far-sighted thinking, but the Gyron Gynorm, of which details are given for the first time on these pages, falls into a different category.

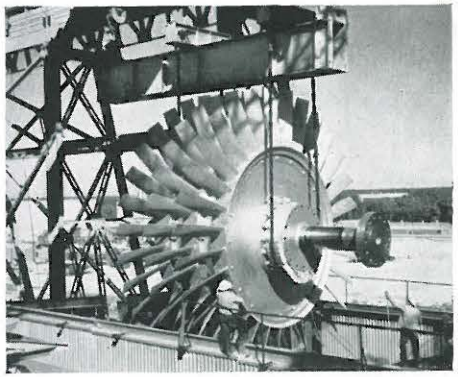
It will be recalled that for some time the de Havilland Engine Company have been at pains to substantiate their claim for the Gyron that it was " the most powerful jet engine in the world." In recent years this has become more difficult for two main reasons. In the first place a security system peculiar to these Isles, whilst allowing a percentage of the total thrust figure to be disclosed, strictly bans mention of the rest. The Gyron, it will be remembered, appeared at the Paris Show with a published output of 25,000 lb. and a few knew of the remaining 6,000 lb. closely pegged by Security. In the second place other and less modest manufacturers have at last entered the supersonic field, and unfortunately with even bigger engines.

If this state of affairs was allowed to remain unchallenged, only carefully qualified and, therefore, misleading statements could be made in public. " The most powerful engine in the world," on the successful first run of a competitor's engine, might have to be changed overnight into " the most powerful type-approved jet engine in the world." It only requires the rival company to experience another modicum of unexpected luck and the claim must again be modified to " the most powerful type-approved jet engine in the world now in an advanced stage of development." Further qualification is difficult to achieve without interfering with the geographical impact. It can thus be seen that an engine which started its career quite simply as " the most powerful jet engine in the world " can, within a very short time, end up as " the most powerful type-tested jet engine to have reached an advanced state of development in Southern England " or, at the worst finally " in Hertfordshire."

At a time when the implications of a White Paper on Defence have, to say the least of it, put a brake on creative thought, it was natural that a strong and virile design team (striving to foresee . . . etc., etc.) should turn from the operational requirement branches of the various Ministries and Services and for once pay heed to a Publicity Department which, if nothing else, was reputed by several members of the Company to possess a budget capable of handling the financial outlay. It was also felt that if such an advanced engine failed in the long run to be favoured by an actual aircraft application this was not altogether unprecedented in the history of the Company.

The accompanying pictures reveal the Gyron Gynorm to be in all major respects a true member of the Gyron family. Low frontal area is combined with light weight and robust construction — all features indispensable to the special formula for high-supersonic flight. A noticeable difference, however, is in the use of a simple 3-stage axial compressor in place of the more usual 7- or 8-stage layout, and this feature was finally decided upon after a long period of study by performance engineers, and clinched by an objection from the Ministry of Transport and Civil Aviation to the effect that the new test rig scheduled to be constructed in the Company's test colony at Hatfield for larger compressors would seriously interfere with long-term plans for widening the Great North Road.

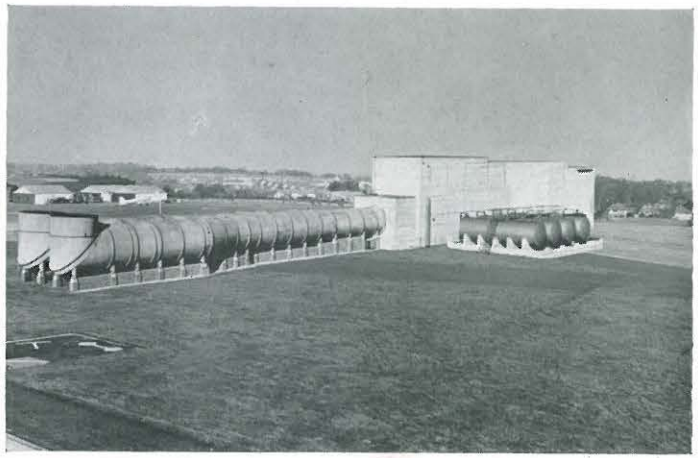
As with other de Havilland engines the Gyron Gynorm was designed and constructed as a private venture and it was only after the prototype had established the validity of the design that the engine was offered to the British Government. At this time future plans for the Gyron Gynorm cannot be discussed but if there is a noticeable restraint in Government circles prior to the issue of instructions to proceed, it is, after all, understandable in an age of military aviation where nobody really knows what they want anyway.



As an important part of the detailed component matching programme which preceded the first run of the Gyron Gynorm, the three-stage axial compressor underwent an extensive series of calibration and over-speed tests. This photograph, taken as the component is lowered into the compressor test rig, clearly shows its compact form and elegant simplicity.

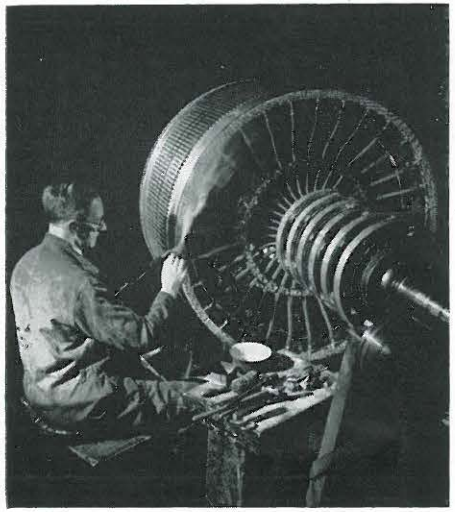
The Editor of Enterprise *is grateful to the Chairman of* Engineering *for his kind permission to reproduce some of the photographs which made possible the article on pages 194, 195, 196 and 197.*

Acknowledgment is also made to The British Thomson-Houston Company, Ltd., Davy & United Engineering Company, Ltd., Thos Firth & John Brown Ltd., The Hydro-Electric Power Commission of Ontario, Ashmore, Benson, Pease & Company and The Air Research and Development Command, United States Air Force, whose products are depicted in a setting for which they were never intended.



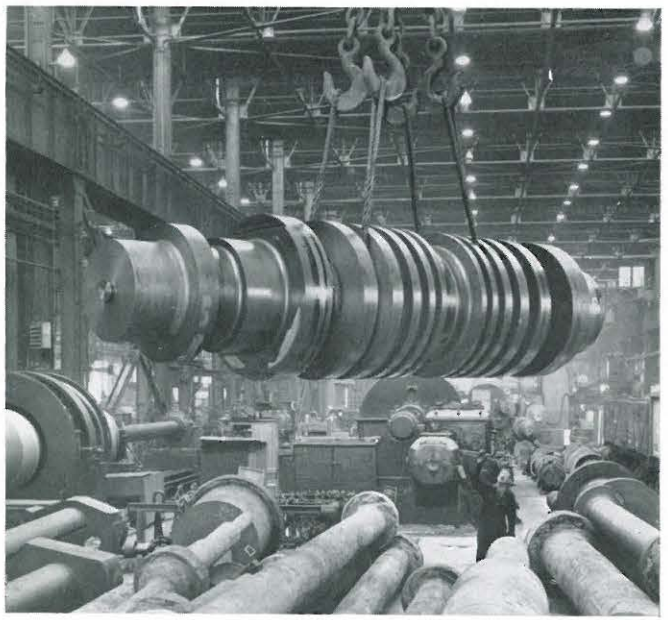
It was considered that an advantageous situation in regard to both economy and efficiency would result if the test work was carried out under the eye of the Publicity Department from whose budget the entire programme was being financed. For this reason the new test bed shown here was built at the Company's Leavesden works, beneath the windows of the commercial manager's office.

Below: Although a slightly scaled-up version of the de Havilland hydrogen peroxide turbo-starter would be fitted to production versions of the Gyron Gynorm, a conventional electric starter motor was used for early running. A craftsman, complete with the intricate tools of his trade, is seen here soldering the armature joints. Mounted in the intake bullet this unit accelerates the engine to its self-sustaining speed within the half-hour.

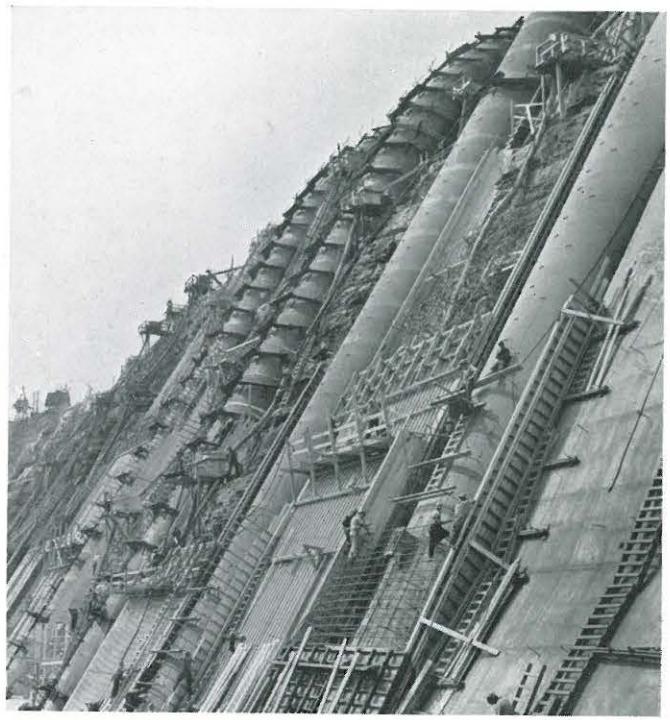


Above: An intensive programme of work was laid down to accelerate the manufacture of the prototype engine, and in this respect it is interesting to note that it had already completed an unofficial acceptance run before drawings could be issued to the shops. Practical craftsmen with practised eye and a flair for improvisation were responsible for this — often, as is shown here, machining from the solid. In the foreground a rear bearing housing and, at the background, an accessory-drive quill shaft take shape from billets of high-tensile steel.

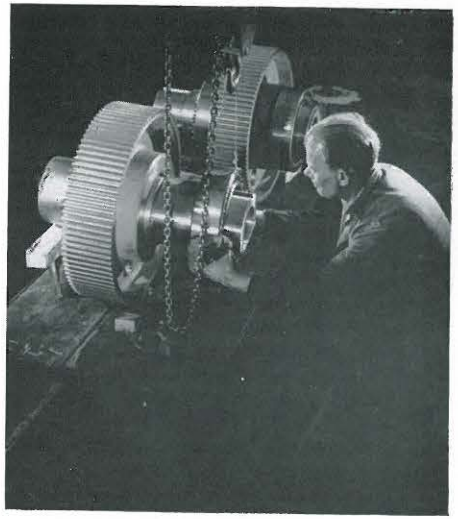
New and weighty difficulties required solution before a satisfactory two-bearing rotor support could be provided. This problem was overcome in the manner shown here.

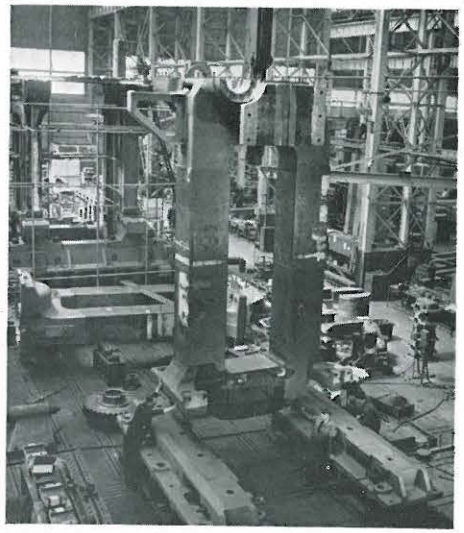


No small effort was required to cement firm foundations for the new engine's future. This view, taken during the extension of the Halford laboratory at Hatfield shows something of the unremitting effort necessary to-day to keep pace with the rising tempo of development.



Below: Detail assembly work on the Gyron Gynorm. The idlers in the fuel and lubrication pump gear-trains are being inspected prior to their installation in the slender intake spoke.





Above: To absorb the massive power output of the Gyron Gynorm, equally massive support frames for the thrust-measuring pads had to be constructed. One of the eight required is shown here in the hands of the Plant Department during the fabrication of the Leavesden bed.