THE STEPHENSON BUILDING, KING'S COLLEGE, NEWCASTLE UPON TYNE

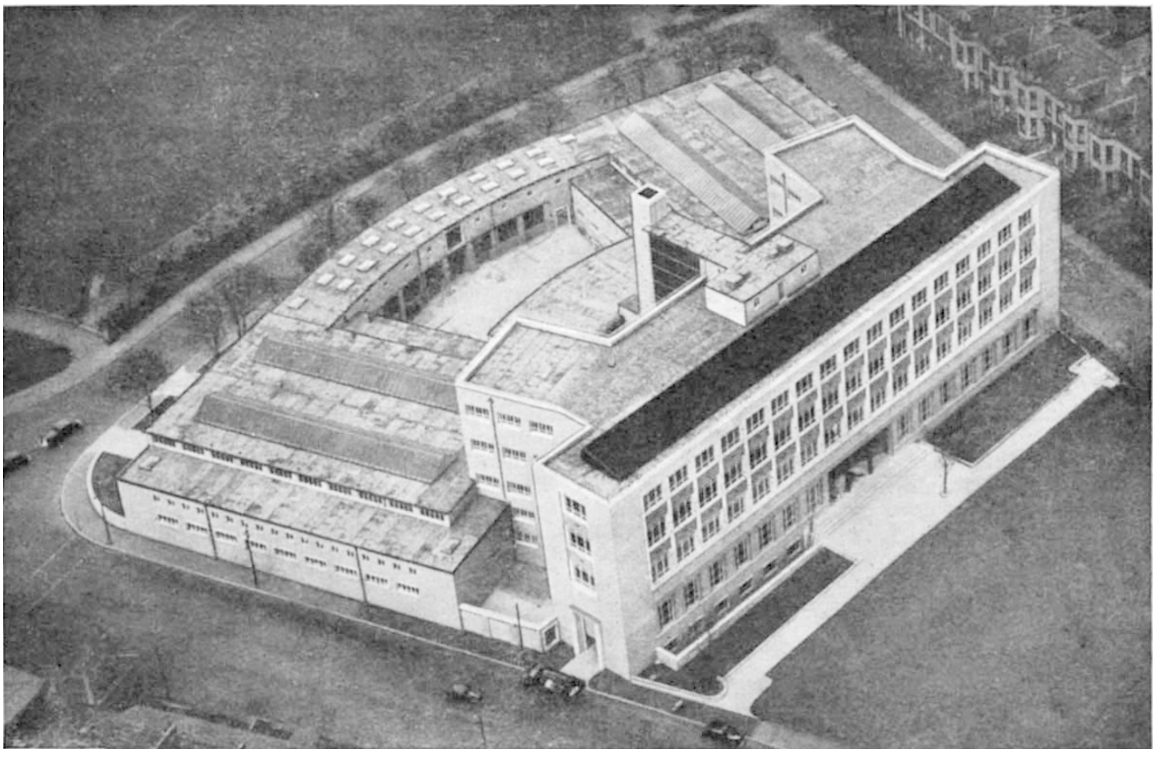
ONE of the most difficult problems of the older civic universities is that of finding room for the expansion necessitated by the large increase in the number of students and the widening scope of university studies. In Newcastle upon Tyne, King's College (the Newcastle Division of the University of Durham) lies near the centre of the city, and the civic authorities, conscious of the value of the College to the city and much impressed by its development in recent years under the guidance of Lord Eustace Percy as Rector, have been of great assistance in making possible the expansion of the College in its present locality. It is thanks to their co-operation, and that of the freemen of the city, that an island site very near the old College has recently been made available for the erection of a new building for the Department of Mechanical and Marine Engineering, with its allied branches of Chemical Engineering, Production Engineering, Fuel Technology and Agricultural Engineering.

This is the Stephenson Building, formally opened on November 28 by H.R.H. The Duke of Edinburgh, who explained in his speech that the building is named after George and Robert Stephenson, the father and son who did so much to develop mechanical engineering. George Stephenson lived for a time within a stone's throw of the site, and it is a matter for congratulation that the Department now possesses his portrait, recently presented to King's College by Dr. S. F. Dorey, president of the Institution of Mechanical Engineers during 1950–51, and a former student of the College. It is a copy of the Lucas portrait painted in 1847 when George Stephenson was the first president of the Institution of Mechanical Engineers.

The Stephenson Building has been designed for the study and teaching of mechanical and marine engineering, and its allied branches. It will accommodate 650 students in all.

The Department is well known for its courses in marine engineering—only three British universities offer such a course. Of recent years, increasing numbers of students from all parts of the world go to Newcastle, not only to attend the University course, but also to take advantage of the opportunity to visit local industries and works concerned with marine engineering and shipbuilding. Apart from the specialized courses, of which marine engineering is only one, students from other branches of engineering and applied science attend the Department of Mechanical Engineering for part of their studies. Other buildings in the College are available for specialized instruction in electrical engineering, civil engineering, metallurgy, naval architecture and mining.

In the Stephenson Building there is 70,000 sq. ft. of working floor space under cover, and half of this is on the ground floor. There is in addition an enclosed courtyard. To make the best use of the site an extra 10,000 sq. ft. of floor space has been added by building an additional storey on the front part of the building. For the time being, the additional floor is being used to accommodate the Department of Mathematics, and the proximity of the Engineering and Mathematics Departments is expected to be to their mutual advantage.



Aerial view of the Stephenson Building *Photo: Turners*

Where very large rooms were required, for example, for laboratories for strength of materials, hydraulics, heat engines, chemical engineering and workshop, goods entrances have been provided directly into each laboratory, and overhead travelling cranes of 5 tons capacity have been installed. Service ducts are provided underground to supply electricity, water, gas and steam to any point required on the ground floor.

The laboratories have been designed so that changes can be made there as easily as possible. For example, there are test points in the walls for tapping off a substantial electricity supply for experimental work; there are grillages in the floor to which apparatus and machined cast-iron blocks may be fixed whenever required. Concrete foundations for machinery have been used only when there was no other alternative. Service pipes have been fixed in many of the laboratories high up on the walls, so as to make access easy for connexions and alterations. Classrooms and lecture theatres have been located in the upper storeys, away from the noise of the laboratories and workshops. A noteworthy feature is the large number of small rooms used for study rooms, classrooms, offices, stores and research rooms. There are more than a hundred of these small rooms in the Stephenson Building, taking up nearly 40 per cent of the total working floor space.

Private rooms for the teaching staff have been placed as near to the laboratories and workshops as possible. This has been achieved by arranging them on a gallery around the periphery of the laboratories, which has the advantage that it provides for observation and supervision of the laboratories without perambulation. In the main block there is a single entrance for students and visitors, so that the laboratories are not used as corridors.

A larger proportion of the resources available than is usual has been spent on workshop facilities. Prof. A. F. Burstall considers that a high-grade workshop equipped with up-to-date machine tools and measuring equipment is the first essential for a department of mechanical engineering, for the dual purpose of making apparatus for the whole Department (and for other departments of the College) and serving as an experimental laboratory for the course that has recently been started in production engineering. This workshop is particularly useful for making special apparatus for students' projects, which are specific tasks allotted to honours and postgraduate students and requiring the design and manufacture of a piece of equipment as part of the student's training. Apart from its value for this purpose, it has been found a useful way of adding to the Department's store of apparatus and special equipment.

At a Congregation of the University of Durham held in the building before the opening ceremony, the honorary degree of doctor of civil law was conferred by the Vice-Chancellor on the Duke of Edinburgh. In declaring the building open, the Duke said that two great wars had destroyed the prosperity which the Stephensons helped to create; it is now the task of universities and technical colleges to train and develop the minds of men who may one day be the means of restoring that prosperity. Engineers and men of science must produce new ideas and improved ways of supplying the world's demands. Prof. A. F. Burstall, head of the Department of Mechanical and Marine Engineering, in thanking the Duke for opening the building, said he hoped that the work done there would justify the faith of the University Grants Committee and the generosity of the Government.

PURIFICATION OF THE CELLULASE OF *MYROTHECIUM VERRUCARIA*

By D. R. WHITAKER

Division of Applied Biology, National Research Laboratories, Ottawa

SINCE the early work of Pringsheim, a multi-enzyme system has been repeatedly postulated to explain the enzymatic breakdown of cellulose to glucose[1,2]. The evidence for this mechanism is largely indirect and, so far as I know, no extensive concentration or purification of any enzyme component has been reported. The need for more direct evidence prompts this communication on procedures for the concentration and purification of the cellulase in culture filtrates of *Myrothecium verrucaria* Alb. et Schw., strain *USDA* 1334.2. Many of the cellulolytic properties of this culture filtrate have been described by Saunders *et al.*[3].

The mould was grown in a medium of 0·1 per cent glucose, 3 per cent benzene-alcohol extracted, ground cotton linters, and mineral salts of essentially the same composition as given by Saunders *et al.*[3]. No glucose was included in the medium for the shake-culture inocula. After nine to twelve days incubation at 30° C., with continuous aeration and rotary shaking, the medium was filtered, chilled to 1° C. and cleared in a Sharples super-centrifuge.

Enzyme activity was assayed by the increase in the Somogyi reducing-sugar titre given by the enzyme after 17 hr. at 35° C. in a shaken 1 per cent dispersion of precipitated cellulose in 0·05 *M* acetate buffer of *p*H 5·6. Thymol was present as an antiseptic. The precipitated cellulose was prepared from non-absorbent cotton by the method of Scales[4], followed by dialysis, precipitation and washing with ethanol, and vacuum drying. The relationship between the concentration of enzyme preparation and the reducing-sugar titre was approximately linear at low enzyme concentrations. The assay standard was taken as 0·5 ml. of untreated culture filtrate in 20 ml. of assay medium, and more concentrated solutions were assayed at dilutions giving approximately the same assay as the standard.

The culture filtrate was concentrated in 30-litre batches to about 8 litres by two passages at 30° C. through a Bartholomew evaporator[5], and then to about 3 litres by slow freezing at − 12° C. in an insulated glass jar, the ice being removed in a basket centrifuge. This concentration caused little loss in activity. The concentrate was cleared in a high-speed centrifuge and fractionated at *p*H 7 with ammonium sulphate; the precipitate forming at between 30 per cent and approximately 95 per cent saturation contained most of the activity. It was centrifuged to minimal volume, extracted by shaking with 200 ml. of distilled water for 6 hr. at 1° C., and the extract cleared by centrifuge. A typical extract, with a protein content of 2·6 per cent, had approximately a hundred times the activity of the original culture filtrate. There was no appreciable loss in activity on freeze-drying or on dialysis against dilute phosphate buffer with gold-beater's skin membranes. In the ultracentrifuge, the extract showed only one peak at *p*H 6·8, but this spread rather rapidly, suggesting polydispersity (Fig. *A*1). Electrophoresis at *p*H 6·8 showed at least four components (Fig. *A*2).

This extract could be purified chromatographically on calcium phosphate gel columns by the method of Swingle and Tiselius[6]. The most active fraction was