ing problems. The method was foreshadowed by Newton in the "Principia", and the theory was extended by Stokes, Helmholtz, Froude, James Thomson, and Osborne Reynolds. The foundations of the method were laid by these pioneers, and the last forty years has witnessed the continued growth of its application to a wide range of problems. Sir Thomas Stanton stated that he did not intend to put forward arguments for their extension; he believed that what is wanted is a somewhat more critical review than has hitherto been attempted of the implications of the method, and of the extent to which engineers may rely on the predictions to full scale made from them. He dealt with the principle involved in scale model testing, and illustrated it by reference to the prediction of the resistance of a ship, the hydraulic resistance of pipe lines, and the prediction of the wind resistance of roofs and bridges.

The concluding part of the lecture contained a review of the present position of engineering research in Great Britain. Sir Richard Glazebrook, in his James Forrest Lecture in 1923, reviewed then the conditions, and the most notable step taken since has been the formation of an important Research Department of the Ministry of Transport under the Roads Improvement Act, 1925, and the inauguration in 1930 of a research station at Harmondsworth. This will probably be the largest engineering research laboratory in Great Britain. There remains the important consideration of whether the financial provision for engineering research is adequate. A comparison of Great Britain with other European countries is difficult on account of the lack of definite information, but a comparison with the expenditure on research in the United States shows that the sum we spend is of very modest proportions. Research, however, is being encouraged in various ways, and, Sir Thomas Stanton said, "taking into consideration the sympathetic attitude of the Research Department, we may, I think, conclude that, apart perhaps from research in aeronautics and metallurgy, the existing provision for general engineering work is adequate, and that should further provision be considered advisable for investigations of national importance, the Department may be relied upon to give all the help that can be made available".

The Royal Institution.

THE president, Lord Eustace Percy, and Managers of the Royal Institution went direct to the core of old English custom when they invited the members and other visitors, representative of the diplomatic and public services, science, arts, literature, and medicine, to a "House Warming" in Albemarle Street. It was held on May 6, and was largely attended. Fleetwood, in an epistolary of 1577, says, "The shoemakers of London having builded a newe Hall, made a royall feast for theire friends, which they call theire house warming". Then, Evelyn chronicles, under date Nov. 28, 1661, "I dined at Chiffinch's housewarming in St. James's Park"; and in a number of the *Spectator* for 1712, the following occurs: "I must make the present entertainment like a treat at an housewarming, out of such presents as have been sent me by my guests".

The primary object of the house warming was, of course, to demonstrate the realisation in material form of the reconstruction effected in the Royal Institution. It has long been recognised that rebuilding and a readjustment of certain parts to modern needs was a real necessity. This applied particularly to the Lecture Theatre, which remained much as it was since completion in 1802, an auditorium, moreover, constructed entirely of timber. We think that the Managers are to be congratulated on preserving so much of the old-time atmosphere of this historic room, the scene of the early experiments of Davy and Faraday and their successors. The scientific equipment of the theatre has now been considerably extended; a cinematograph projector and an epidiascope have been installed, together with many technical desiderata essential for the proper and convenient elucidation of lecture subjects.

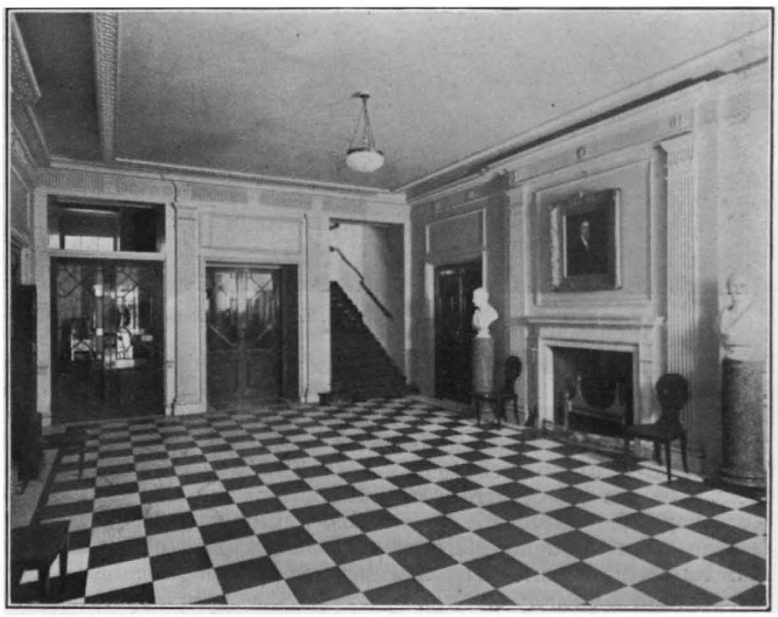

FIG. 1.—New Entrance Hall, Royal Institution.

The rebuilding of the Lecture Theatre has

naturally involved the replanning and reconstruction of a large adjacent part of the building. The ante-room on the first floor has been enlarged and redecorated in excellent taste. Opening from this is the ambulatory, around which, beneath the seating of the theatre, well-lighted showcases for historic apparatus in the possession of the Institution have been arranged. Opening from the opposite side of the ante-room is a long corridor giving access to the Far Library and also to the Davy Faraday Research Laboratory.

A new entrance hall has been constructed, and this is supplementary to the fine old entrance hall, and staircase, adjacent, which was in existence in 1799 at the foundation and occupancy of the building. A large new chemical laboratory has been built on the ground floor, and some of the rooms replanned, to enable an exit from the Lecture Theatre direct to the street to be made. The basement area has been rearranged, and contains the workshops, the equipment for the distribution of electric power throughout all parts, and the heating and ventilation plant. The new heating system in operation is entirely electric.

An interesting programme was arranged for the house warming. All parts of the Institution were open to guests, including the director's flat on the second floor, which contains Faraday's study. Sir William Bragg gave demonstrations in the Lecture Theatre, comprehended in the title "Classical Experiments of the Royal Institution". He showed Davy's experiments on the decomposition by electrolysis of potash to obtain metallic potassium. Faraday's experiment on the induction of electric currents in a coil by the movement of a magnet into and out of it was shown; his 'great cube' experiment, to show that electricity resides on the outside of a conductor, was also demonstrated, for which purpose a small wire cage was erected in the Lecture Theatre. This experiment must have been described in hundreds of text-books, but there are probably not many who have seen a person sitting unharmed inside an electrified cage while sparks are drawn from the outside. Rayleigh's experiment on the production of a sound shadow was also shown; the sound waves from a bird-call were obstructed by a glass disc, on the other side of which a sensitive flame gave a response only when on the axis of the disc, due to a diffraction effect of the sound waves. In relation to Sir James Dewar's low temperature work, a diamond was heated in a crucible and thrown into a dish of liquid air, where it burnt, deriving oxygen for combustion from the liquid air. The historical apparatus in the keeping of the Institution was displayed and supplied with full descriptive particulars. In addition, there were exhibits and experiments in the Davy Faraday Research Laboratory illustrating the latest developments in the technique of X-ray crystal analysis; these included a demonstration of the rotating cathode X-ray tube developed by Dr. A. Muller.

FIG. 2.—Lecture Theatre, Royal Institution.