In north central Oxford, where most of the present science faculty buildings stand, the university has done well to buy (or to be in the process of buying) one million square feet of buildings, after the recommendation of the Holford Committee which reported in 1963. New departments of psychology and zoology are at present being built and the Radcliffe Science Library, the School of Geography and the Physics Laboratories are being extended. Since the Holford Committee sat, sixteen houses have been bought from colleges for the use of the Social Science Departments, and some of these have already moved into their new accommodation. Congregation will now have voted on the proposal to buy another nineteen houses, with 100,000 square feet, for science facilities. Despite the Government's statement of January 16, 1968, further projects may be included in the building programmes for 1970. A new computer library will be built, and the adjacent Departments of Engineering, Survey and Geodesy and Metallurgy will be extended. The professors of these departments have already agreed to share as many facilities as possible, following the example of the zoology/psychology building, which will, the Hebdomadal Council states, guide many future developments.

Reinforced Plastics

THE production of carbon fibre reinforced plastics (CFRP) is now going ahead even though licensing and financing arrangements between the National Research Development Corporation and the three firms involved—Courtaulds, Morganite and Rolls-Royce—have not yet been finally decided. Rolls-Royce is producing the plastics for its own use, but Courtaulds and Morganite will sell CFRP in the general market. Morganite is quoting prices of £35 per lb for batch fibre and £100 per lb for continuous fibre, but it is acknowledged that prices will fall considerably when mass production is achieved.

The development and applications of these very strong plastics were described by Mr L. N. Phillips, head of the Plastics Technology Section, Materials Department, of the Royal Aircraft Establishment, Farnborough, at a joint session of the plastics and polymer group of the Society of Chemical Industry and the London Section of the Plastics Institute, on February 22. Mr Phillips began by pointing to the considerable experience of RAE in the development of cellulose, asbestos and glass reinforced plastics for structural purposes. The general engineering opinion was that glass fibre has too low a Young's modulus, compared with metals, to be attractive for structural purposes. Conversely, it was reasoned that a new fibre with a Young's modulus three to six times greater than glass would be of considerable interest.

Attention was focused on carbon fibres some four years ago, because of the wide difference between the properties of commercial fibres then obtainable by rayon pyrolysis (Young's modulus 6–9 million lb per square inch, with ultimate tensile values of 50,000 lb per square inch), and the properties of graphite whiskers (Young's modulus between 100 to 147 million lb per square inch). Details of the RAE processes for making high-strength high-modulus carbon fibres could not be given for commercial reasons, but the principle is to preserve the orientation already existing in a highly aligned textile fibre as the polymer is destroyed by heat. (The inventors are W. Watt, W. Johnson and L. N. Phillips.) Experiments with the composites at RAE have shown that water absorption is not a difficulty and that the fatigue life under various conditions is excellent, the heat build-up during fatigue testing being much less than with glass and other non-conducting fibres. Friction and wear tests carried out at Farnborough have shown that when carbon fibres are incorporated into thermoplastics and thermosetting resins, the coefficient of friction is lowered and the rate of wear enormously reduced. It seems as if a new class of bearing materials has been created. But many other uses for the materials have been uncovered—the Rolls-Royce Company has, for example, used them for very large fan blades in aircraft engines, which have a clear advantage in efficiency over titanium. Aircraft structures, chemical plant, marine uses and space applications were also mentioned.

Considerable increases in the stiffness of thermoplastics are obtained by incorporating small amounts of chopped carbon fibres—for example, 10 per cent weight addition can increase the modulus by 100 per cent. This is important in the manufacture of large mouldings.

Sensible suggestions for further uses of CFRP are welcomed by the Ministry of Technology.

Crack Detector

THE development of a new instrument for detecting invisible cracks in iron and steel surfaces was announced on Monday by the National Research Development Corporation. The new instrument works on the principle that a coil carrying an alternating current will induce eddy currents in nearby conducting materials. When the coil is moved over a surface crack, the crack causes variations in the eddy currents leading to a change in the voltage across the coil. This can be detected by a meter or made to sound a warning buzz in an earphone worn by the operator.

Eddy current techniques in non-destructive testing are not new, but up to now they have not been widely applied to ferrous materials. This has been because variations in the distance of the coil from the material under examination, such as might be caused by paint or rust layers, lead to interfering effects. The advantage of the new instrument is that it can be compensated for variations in the gap between the coil and the metal. This means that once the electronic circuit has been balanced for a particular specimen the instrument can be used over rough surfaces which may be covered by paint or rust, and over welds.

The initial impetus for the design of a crack detector was provided by the discovery of cracks in the hull of the nuclear submarine HMS Dreadnought. The instrument was developed by the Admiralty Materials Laboratory at Poole, and the patent rights were assigned to the National Research Development Corporation for exploitation. Two licensees have been appointed to manufacture and sell the instrument.

Because the new detector is simple, portable and rugged, it is likely to find many applications for testing structures in the field. Time savings of more than 80 per cent are expected when compared with conventional magnetic methods of crack detection, which involve cleaning the surface under examination. About