

the late 1950s. There are two other smaller Beecham research laboratories—at Walton Oaks, Surrey, and Harlow, Essex. The first of these was part of the research organization of Vitamins Ltd, a company bought by Beecham in 1967, and the second was opened by Beecham itself in 1969. Most of Beecham's nutritional research is carried out at Walton Oaks and the Harlow laboratory is responsible for the synthesis and evaluation of compounds other than antibiotics.

Research at Glaxo is also conducted at three chief research centres, two of which were inherited as a result of the purchase of Allen and Hanburys and BDH Pharmaceuticals. Most of the Glaxo research is centred on Glaxo Research Ltd, Greenford, and some is also carried out by Glaxo subsidiaries in India and Italy. The planned growth of expenditure by Glaxo on research and development was spelled out by Sir Alan Wilson in the company's annual report for 1969-70. He then announced that the research and development budget would double by about 1975. Extensions to the research laboratories of Glaxo and those of Allen and Hanburys are also in hand and are expected to be completed by the middle of 1972 at a cost of £5 million.

It may be significant that about 65 per cent of Beecham's sales are of non-ethical products whereas the corresponding figure for Glaxo is 45 per cent. Glaxo has yet to show that it will reap just rewards from the £55 million which it has invested in drug manufacturing plant since 1969.

SPACE

Ionosphere Probe

EARLIER this week the latest in the Ariel series of British satellites was being prepared for launch from the Western Test Range in California on December 11. The satellite is a repetition of the previous satellite in the series, Ariel 3, but with many significant modifications and improvements. An experiment from Professor L. A. Frank's group at the University of Iowa has been added to the previous portfolio of experiments from Jodrell Bank (Professor F. G. Smith), the University of Sheffield (Professor T. R. Kaiser), the University of Birmingham (Professor J. Sayers) and the Radio and Space Research Station of the SRC (Mr R. Dalziel). An experiment from the Meteorological Office on Ariel 3 has been omitted this time.

As luck would have it, a fault connected with the EHT monitor in the guest experiment from Iowa has been responsible for a postponement from the original launch date in November, since when Professor Frank's group has been

working to ensure that the fault does not reflect a more serious problem within their experiment.

Ariel 4 was designed to provide an integrated series of experiments to study the interactions among plasmas, particles and waves in the upper ionosphere. To this end it will be placed in a 550 km orbit inclined at 83° to the equator to ensure world-wide coverage. Like its predecessor, Ariel 4 will rely on tape recording to store information until the satellite passes over a ground station. Although the tape recorder on Ariel 3 worked perfectly for 9-10 months (surpassing the previous record of 3 months for the durability of a tape recorder in space), the experimenters are aware that the recorder is the weak link in the system. Ariel 4 therefore carries two tape recorders to postpone the time when the experimenters will have only real time data available to them.

The original design has also been modified to include safeguards against interaction between the aeriols of the Birmingham and Jodrell Bank experiments, which on Ariel 3 resulted in signals from the Birmingham experiment being picked up by the Jodrell Bank experiment and interfering with the collection of data.

By obtaining simultaneous observations of various aspects of the conditions in the upper ionosphere, Ariel 4 should throw some additional light on the physical processes involved in the ionosphere and magnetosphere. The Iowa experiment will examine protons and electrons between 5 eV and 50 keV, the Jodrell Bank experiment will look for radio waves which it is believed may be generated by streams of charged particles interacting with the magnetosphere and ionosphere through the Čerenkov effect, the Sheffield experiment will record ELF and VLF emissions related to the flux of charged particles as well as emissions originating from stations on the ground (which are of course influenced by the conditions in the ionosphere) while the Birmingham experiment will provide the measurements of local electron temperature and density which are essential to an interpretation of the other data. The Radio and Space Research Station is involved in both the Jodrell Bank and Sheffield experiments.

SPACE

Per Ardua ad Terminum

from *La Recherche*

No complete technical explanation for the failure of Sunday's Diamant B booster rocket seems likely in the immediate future. The Diamant B has been used successfully on three previous occasions, but a strong vibrational "pogo effect" was noticed on each

occasion and, in spite of repeated efforts to eliminate this, it proved impossible to do so. There were also defects in the Diamant B's electronic systems which helped delay this last launching, originally planned for December 2. Yet neither of these shortcomings appears to be responsible for Sunday's abortive mission.

Psychologically, the consequence of this episode is one of virtual disaster at the Centre National d'Etudes Spatiales (CNES) where the government's budgetary austerity had already introduced a note of uncertainty into the future of the French space programme. Politically, the failure of this last launching could not be more inopportune. The French government had envisaged, for some time now, imposing financial limitations on France's role in the space effort. A study group was to have examined, in January, the possibility of reducing expenses at the Guyana base, and if need be even closing down the base for several

Royal Society

PROFESSOR A. L. HODGKIN was re-elected president of the Royal Society at the anniversary meeting of the society held last week. The other officers re-elected were Sir Fredrick Bawden, Rothamsted Experimental Station, treasurer; Sir Bernard Katz, University of London, biological secretary; and Sir Harrie Massey, University of London, physical secretary. Professor K. C. Dunham, University of Durham, was elected foreign secretary.

The full council of the Royal Society for this year will consist of the officers, together with Professor E. J. W. Barrington, University of Nottingham; Professor J. W. S. Cassels, University of Cambridge; Professor A. R. Collar, University of Bristol; Dr H. M. Finnieston, British Steel Corporation; Professor L. Fowden, University of London; Professor R. A. Gregory, University of Liverpool; Professor H. Harris, University of Oxford; Professor A. W. Johnson, University of Sussex; Professor R. V. Jones, University of Aberdeen; Professor R. A. Morton, University of Liverpool; Professor C. W. Oatley, University of Cambridge; Professor D. C. Phillips, University of Oxford; Mr J. D. Rose, Imperial Chemical Industries Ltd; Professor P. A. Sheppard, University of London; Professor K. Stewartson, University of London; and Professor D. H. Whiffen, University of Newcastle upon Tyne.