A7/A1

Abingdon 1220
Ext: 2600

8th August, 1961.

Dear Pickavance,

Atlas Computer - Press Release

Willis sent me with his letter of 28th July a copy of the draft press release.

A few suggested amendments are inserted in pencil on the draft now returned, including those mentioned in Gaunt's letter to me dated 2nd August, of which you have a copy.

With these amendments, I approve the issue of the press release.

Yours sincerely,

D. A. Holman

p.p. F. A. VICK
(Dictated by Dr. Vick and signed in his absence)

Dr. T. G. Pickavance,
Director,
National Institute for Research in Nuclear Science,
Harwell.

c.c Sir William Penney
Dr. J. Howlett

DRAFT PRESS RELEASE

An Atlas electronic digital computer has been ordered for the National Institute for Research in Nuclear Science. The computer, together with the necessary buildings, will cost about £3½ million. It will be installed at the Institute's Rutherford High Energy Laboratory, Harwell, for common use by the Universities, the U.K. Atomic Energy Authority, Government Departments and the NIRNS itself. It should be ready for use early in 1964. As in the case of the Institute's other facilities, university requirements for use of the computer will be judged on their scientific merits, and when accepted will be met without charge to the Universities.

The "Atlas" computer made by Messrs. Ferranti, has been developed in co-operation with scientists at the University of Manchester, where the prototype is now being assembled. The U.K. Atomic Energy Authority and certain universities have substantial requirements for time on such a machine, but the Atlas can cope with so much work that it was decided to provide one machine for common use in the first instance, and the Institute were invited to manage it. While they have accepted the responsibility in this instance, the Institute anticipate that future computers of this size for university use will not be concentrated in their hands, but that there will be requirements for them at some individual universities.

The Atomic Energy Authority have been intimately concerned with the development of the project now entrusted to the Institute, and will continue to be closely associated with it. They are also handling the contract negotiations for the Institute.

Background Notes

The power of the electronic digital computer lies in its ability to carry out arithmetical and logical processes at extremely high speeds and to operate with large quantities. It is a universal tool, for all exact scientific work is based on mathematical statements of the laws of nature. The computer enables the consequences of these laws to be followed with speed and precision. Serving so many different users, the ATLAS will work on a very wide

range of problems a few of which are indicated in the following.

The Atomic Energy Authority is the largest user of computers in this country; large amounts of computation have gone, for example, into the design of nuclear power reactors and the study of their behaviour. At Harwell the biggest demands on Atlas are likely to be made by the Culham Laboratory team (located at present at Harwell) and by the Solid State physicists. The central problem of the Culham work is the study of the behaviour of a mass of plasma - a gas containing positive and negative ions when acted on by electric and magnetic fields including the magnetic field produced by its own movements. This is a most complex problem and it has become clear that a real understanding of the behaviour of thermo-nuclear devices will require computations of the greatest intricacy and of the largest size. The need to understand the physics of solids is of great importance in all work on the materials used in nuclear reactors including the fuel elements, the moderators and the structural materials. To predict the behaviour of these materials in the severe conditions of temperature and irradiation in a reactor again requires very extensive calculation. In addition to such major projects a scientific institution as large and varied as Harwell has a permanent need for computation at all levels of size and complexity and ATLAS will allow a very fast and efficient service.

University research, of course, covers the whole field of science and the universities are finding a rapidly increasing need for large scale computation. The ATLAS is intended to supplement the resources of the individual universities and to enable attacks to be made on problems of exceptional size such as those of astro-physics, cosmology, fluid dynamics and molecular structure, the last including the exceedingly complex and important work on protein and virus structure. As one example, in the field of crystallo-graphy and structural chemistry an entirely new approach to the problems has become possible. The structure of vitamin Bi was worked out by the analysis of X-ray diffraction patterns on a

computer and work of a similar kind but on a much larger scale is already in progress on the protein myoglobin.

The National Institute itself will require a very large amount of computation in the work of interpreting the experiments made with the 7,000 MeV proton synchrotron NIMROD which is under construction at the Rutherford Laboratory. An ORION computer is to be installed to deal with the bulk of this but there will be much that is beyond the Orion capacity for which Atlas will be used. It will be used also in theoretical studies of future high energy accelerators, involving calculations of the motion of charged particles in electric and magentic fields which vary both in space and in time.

Of the Government scientific establishments, the Meteorological Office is likely to be one of the main users. The idea of predicting the weather by computation is about 50 years old but the scale of the task made this quite impractical until the electronic computer was developed; the mathematical problem is the integration of the partial differential equations for the pressure and temperature distribution and the motion of the atmosphere. The Meteorological Office has been working on this problem with the help of its Mercury computer for some years and is now using numerical methods for part of its forecasting. The Atlas will allow a big extension to be made, first in the research and later, it is hoped, in the actual forecasting service.