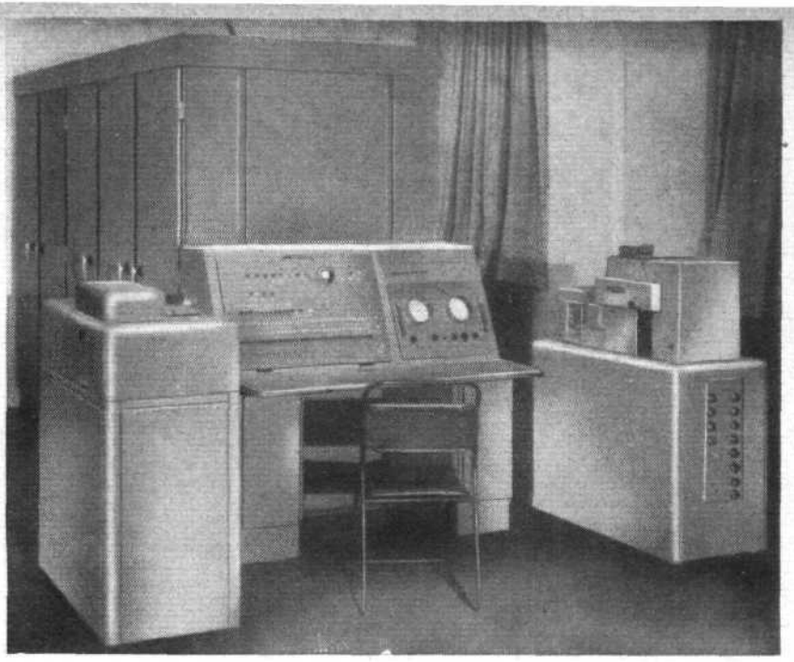
THE DEUCE

English Electric's Digital Computor



The main units of the Deuce are here shown set up for operation. The Deuce has already assisted in the solution of Canberra aerodynamic and structural problems, and in the immensely more complex problems of the P.1 supersonic interceptor and guided missiles.

WHEN, shortly after the end of World War 2, the National Physical Laboratory wished to develop an electronic calculating machine of greater potential than any built previously, they sought assistance from the English Electric Co., Ltd. Scientists and engineers from the latter co-operated with the N.P.L. to such effect that the pilot-model ACE (Automatic Computing Engine) was put "on steam" at the N.P.L. mathematics division early in 1952, since when it has proved outstandingly successful.

Naturally enough, the English Electric Company, finding itself with an immeasurably valuable team of workers completely versed in the development problems of large computors, decided to embark upon the development and production of advanced forms of electronic computor as a commercial proposition. Certainly, there are few organizations which can hope to rival the English Electric Group in range of technological skills, and even fewer which could hope to carry through such a programme.

The first computor marketed by the company is known as Deuce (Digital Electronic Universal Computing Engine), and is virtually a "custom-built" fully engineered version of the ACE, embodying all the lessons learned in the development of the earlier equipment. Basically, Deuce is fairly straightforward, but it is exceptionally versatile; the company believe it to be "the most powerful and most competent electronic calculating machine in Europe."

In common with most large digital machines, Deuce has two "memories" or storage capacities. The bulk store is a magnetic recording drum, on which can be "written" 8,192 "words," or more than one-quarter of a million digits, on 256 tracks. The drum has two sets of writing or reading units, each with 16 heads which can be moved into any of 16 positions, giving access to the required track in 25 milliseconds. For much more rapid operation, required by the computing circuits themselves, information actually in use is stored in mercury delay lines, of which 12 can each store 32 "words" and 10 are shorter lines filling the role of accumulating registers and similar functions.

Optimum coding is employed, i.e., each instruction includes information on the timing and duration of current transfer and the position in the store from which the next instruction is to be taken. Consequently, elementary operations (such as addition) can be performed within 64 μ seconds; multiplication and division require two milliseconds, during which time the other functions of the machine can carry out other operations.

The first examples of Deuce are equipped for control by punched cards of standard 80-column type. Input and output units "read" at 200 and 100 cards per minute, respectively, and data can automatically be transferred to, or from, non-decimal form, such as sterling. If required, the input and/or output can be of a different character, such as punched paper tape or magnetic tape.

Although careful attention has been paid to considerations of accessibility and ease of replacement of defective parts or circuits, the whole computor can be installed on a floor area 14ft by 4ft 6in, with the exception of the mercury delay lines which are housed in a thermostatically controlled drum 3ft in diameter and 3ft 6in high located a suitable distance away. All the 1,300-odd valves are of standard miniature patterns, and isolation from the supply mains by a motor-alternator set is unnecessary. A point of particular note is that marginal checking circuits are provided which can, in a few minutes, steadily narrow down and finally locate the source of any incorrect operation.

The first Deuce to be operated by the English Electric Company is at the company's works at Stafford. A second Deuce will be installed at the Group head office at Marconi House, London. Two more Deuces have also been made for outside purchasers: one for the National Physical Laboratory and the other for the Royal Aircraft Establishment, Farnborough. The capital cost of the Deuce is of the order of £30,000 to £40,000. In the course of time, the English Electric Company intend to establish a completely comprehensive data-processing business, fully comparable with that built up by one or two firms in the U.S.A. On the face of things, it would appear that the Group have an excellent chance of assuming a commanding position in this rapidly growing field.

The Group have announced their intentions and future policy in the field of digital computors in the following terms:—

(1) A computing centre has already been set up in the Nelson Research Laboratories at Stafford and a further centre will shortly be established in London. A Deuce computor will be permanently located at each of these centres and a team of skilled mathematicians and operators will be available to offer a full computing service to organizations not requiring a machine for their own full-time use.

(2) Where customers prefer to operate their own computational service the company will build Deuce computing machines for installation and operation within the customer's own organization. Productive capacity for the Deuce has already been absorbed for 1955 but the company can now accept orders for delivery early in 1956.

(3) The company is setting up a maintenance organization to provide a regular and expert service to ensure that these machines are kept in optimum condition.

(4) A training service will be available based on the two computing centres for initiating scientists, mathematicians and machine operators in the actual use of machines supplied to their organization.

(5) A library of information is being set up in which will be recorded the programmes and sub-routines which have been worked out for the solution of problems, and this information can be made available to customers if required.

(6) A development programme is in hand to add other information handling equipment—such as magnetic tape—to enable the machine to process different forms of mathematical and experimental data. In the future the company expects to extend the range and improve the performance of the machine and provide a comprehensive range of data processing equipment for all kinds of scientific work.

PHOTOGRAPHERS' FAIR

THE first British Photo Fair for 20 years is being held in London—at the New Horticultural Hall, Westminster— from May 16th to 21st. It will be the most comprehensive display of its kind ever staged, with 50 exhibitors and 100 stands showing what the British photographic industry has to offer.

One exhibitor will be the journal *Amateur Photographer*, which is co-operating with the organizers in providing a number of useful services. These include the organization of a series of daily lectures by famous photographers. Dr. Harry Baines, president of the Royal Photographic Society, will speak on *Colour Photography;* Baron on *Photographing Beautiful Women;* Barnet Saidman on *Journalistic Photography;* Angus McBean on *Theatrical Photography;* Walter Nurnberg on *Pictorial Lighting;* and a representative of Vogue Studios on the work done there. Accommodation is limited and seats will be allocated in strict rotation: application for tickets should be made to *Amateur Photographer*, Dorset House, Stamford Street, London, S.E.1, naming the lecture(s) which the applicant desires to attend.

The journal is also running a free photographic competition for which some £250 in prize money is being offered. Full details, together with a comprehensive guide to the exhibits will appear in a special "British Photo Fair" number of *Amateur Photographer* appearing on May 18th.