⟨unique line⟩::= **UNIQUE** (⟨expression⟩) ⟨cell⟩ ⟨set⟩ ≠ |
UNIQUE ⟨cell⟩ ⟨set⟩ ≠

⟨description line⟩::= **ALL** ⟨cell⟩ ⟨set⟩ ≠ | ⟨exists line⟩ | ⟨unique line⟩

⟨find line⟩::= **FIND** ⟨cell⟩ ⟨set⟩ ⟨criterion⟩ ≠

⟨criterion⟩::= **FIRST** | **LAST** | **ANY** | **MAX** (⟨expression⟩) | **MIN** (⟨expression⟩)

⟨simple test statement⟩::= ⟨simple test⟩ ⟨destination⟩ ≠ | ⟨set test⟩ ⟨destination⟩ ≠

⟨complex test statement⟩::= ⟨complex test⟩ L ⟨destination⟩

⟨find compound statement⟩::= ⟨find compound⟩ L ⟨destination⟩

⟨set compound statement⟩::= ⟨set compound⟩ ⟨destination⟩ ≠

Appendix 2

Example

This example is based on a CSL program used by Thomas Skinner & Co. Ltd., publishers of the ABC timetables, to work out routings for the Quick Reference Section of the ABC World Airways Guide.

Initial statements in the program read in a two-dimensional data array of mileages between all airports in a given part of the world, and establish three sets which hold subgroups of airports. The first of these, AIRPORTS, holds the names of those airports between which possible transfer routings involving one change of aeroplane are required. The second set, TRANSFERPORTS, holds the names of the major airports where transfer facilities are possible. The third set, USED, is used during the program as a working-space set. A transfer routing is permissible provided that the total mileage flown does not exceed the direct mileage by more than 15%.

The following program establishes valid transfer routings. The initial statements are omitted and the output statements are stylized to avoid the introduction of detail which has not been fully described in the paper. The transfer airports for each airport pair are written out in the order of increasing total mileage.

```
    FOR A AIRPORTS
      FOR B AIRPORTS
        A LT B & 2
        WRITE A, B
        ZERO USED
1       FIND X TRANSFERPORTS MIN
            (MILEAGE (A, X)+MILEAGE (X, B))
            & 2
          X NE A
          X NE B
          100* (MILEAGE(A, X)+MILEAGE (X, B))
            LE 115*MILEAGE (A, B)
          AIRPORT. X NOTIN USED
        WRITE X
        AIRPORT. X HEAD USED
        GO TO 1
2       DUMMY
    EXIT
```

Book Review

An Introduction to Numerical Methods, by R. BUTLER and E. KERR, 1962; x + 386 pp., 8¾ × 5½ in. (*Pitman.*) 40s.

In spite of reference in the Preface to the high-speed computer and to automatic computing, this book is entirely concerned with methods for desk computing, and even then only with the more elementary ones.

It is a long-drawn-out exposition of these elementary methods with a large number of numerical examples.

It contains a discussion of rounding-errors (in chapter one), the solution of algebraic, transcendental and simultaneous linear equations (avoiding matrices), and including accounts of synthetic division, Horner's method, etc. (chapter two), Finite Differences (chapter three), Interpolation (chapter four), Numerical Differentiation and Integration (chapter five) and the solution of differential equations (chapter six), all at a level much more elementary than, for instance, in Hartree's *Numerical Analysis*.

J. C. P. MILLER.