The Prospects of computerized
Research on Homer

After the appearance of my suggestion by letter that a con-
sortium be formed among those working on Homer (Revue de
l'international Organization for Ancient Languages analysis
by Computer, 1966 no 1, p. II), J. A. Davison of Leeds kin-
dly informed me that the Rev. A. Q. Morton had punched, un-
der the auspices of Leeds University and the Institute of
Classical Studies, London, a complete computer tape of
Iliad, Odyssey, Hymns and Hesiod and that the tape was now
in the possession of A. J. Beattie in Edinburgh. This is
good news, and Professor Beattie informs me that the tape
will be ready for use during 1967. The tape is a plain text
without accents or breathings but with punctuation. It ap-
pears that this tape will be available to those wishing to
work on Homer and Hesiod, but I am not yet certain of the
following points about its suitability for all needs:

1) For what computers is it adaptable ?

2) Has it a line-numbering device, such as an end-of-line mar-
ker, which will allow the book and line number of any word
to be allocated automatically?

3) Is it based on an internationally acceptable set of texts?
The international standard should be the texts adopted in
Hamburg for the Lexikon des frühgriechischen Epos (fasc. 1,
p. XI), as it seems desirable that the vast quantity of re-
search on Homeric language and style which will be facilita-
ted on the computer should be coordinated to complement and
assist that undertaking. However, it is obvious that a com-

plete list of vv. 11. and omitted lines will have to be added to the inventory index. Assuming that this computer tape is to become the archetype and parent of all computer work on Homer it appears that work will move fairly rapidly in five directions: (1) morphology, (2) syntax and other grammatical problems, (3) word order and clause order, (4) style, (5) metre.

1) In morphology I had planned to analyse by hand all morphemes, but my colleagues in this university who have used computers in other languages show me that more valuable results are obtained by setting up a parsing programme, in which the computer itself attempts to analyse words into their component morphemes. Greek has a high degree of ambiguity in this respect and it is interesting, and perhaps important, to allow these ambiguities to appear, for it may be that morphological ambiguities are not always resolved by semantic criteria alone (i. e. by knowing what the word or its parts mean) but sometimes by grammatical criteria. Thus if the machine is to attempt to analyse words ending -os one may set up the various grammatical categories for which this is marker, but morphophonemic characteristics such as XoXos combined with grammatical characteristics such as the article or the proximity of another noun may be found to reduce this ambiguity substantially. Other problems set the computer may be exemplified by what to do with ἄν , ἐπ , augment+vowel.

I am particularly interested in this problem, particularly the results of an analysis of sigmatic verbal endings (a problem I forecast in an analysis of καλύπτω in Glotta 42, 1964, 19-38), and I hope to have a COMIT programme ready to apply to the text so soon as the tapes become available to me.

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2) My own problem is inextricably involved with syntax and the "meaning" of the syntactic slots of various syntactic structures, a problem which seems to me of great urgency in the application of modern generative grammar to all highly- inflected languages. This interest may not, however, be of the same interest to classical philologists as the prerequisite morphological analysis.

3) Professor Beattie's interest is in "basic sentence structure", which does not overlap mine, so far as I understand, but revolves around the highly important question of describing the basic principles of word-order, clause structure, subordination, parataxis and the categories of relationship within the sentence. This will, I imagine, analyse such things as the important work of K. J. Dover (Greek Word Order, Oxford, 1960) as it affects Homer, and the intriguing speculations of Harry and Agathe Thornton, Time and Style: A psycholinguistic essay in classical literature (Dunedin, 1962), to which see F. W. Householder, Jr., Gnomon 36, 1964, 792-5.

4) The majority of the replies I have had to the letter in the Revue have concerned style. Among these two projects deserve special mention. Bernard Fenik, of Princeton, is engaged in a study of the typical and atypical in Homeric battle scenes. James T. Hooker, of University of California, Berkeley, and his colleague Nagler propose an examination of formulaic variation. It is here to be lamented that the valuable work of A. Hoekstra (Homeric Modification of Formulaic Prototypes, Amsterdam 1965) was done in the immediate pre-computer era, but no doubt his work will be of value to Hooker, Nagler and others.

5) All questions of style, syntax and word-order depend in some degree on an analysis of Homer's metre. It is here unfortunate that the preliminary work of James T. Mc Donough, of St. Joseph's College, Philadelphia, is available only in two

copies, kindly loaned to his teacher, H. N. Porter, of Columbia University, and myself. Mc Donough has assigned metrical-word-type numbers to all words in the Iliad, produced lists of all occurrences of each type and analysed the various types possible before each caesura. This is work of radical importance to any future investigation of Homer's metre, formulae and style, and one laments that it was not available to Hoekstra and others who have worked in this area.

It serves to make intelligible Homer's method of declining or conjugating a verb within the hexameter, reveals the bases of old metrical laws and reveals the nature of their exceptions. I hope to provide to this a translation code which will enable the computer to identify from the word-type of any given word in the text its actual metrical word type (MWT), the other actual words which could be used here and the other metrical word types possible after or before each of its word junctures. So far I have only reached the stage of tabulating compositional word-types (CWT).
For example:

Μῆνιν ἄειδε, θεά, Πηληϊάδεω ᾿Αχιλῆος

$[\stackrel{1}{-}\smile]$ $[\smile \stackrel{2}{-} \smile]$ $[\smile \stackrel{3}{-}]P[\stackrel{4}{-} \smile \smile \stackrel{5}{-}][\smile \smile \stackrel{6}{-} \smile]$

MWT /7+79+49/+/106+ 13/

The line is not particularly common, although MWT 13 contains 94,6% of all occurrences of CWTs$[\smile\smile - \smile]$ and $[\smile\smile - -]$; and the long MWT has 31 of the 82 instances of its CWT. MWT 7 has only 29,4% of CWT $[- \smile]$; MWT 49 has 26% of CWT $[\smile -]$; and MWT 79 has a mere 10,5% (against $[\smile \stackrel{3}{-} \smile]$ 75%). The variations are largely due to the word order required by sense and to the facts of Greek grammar. Mc Donough's work is opening up new vistas in the understanding of the interplay of sense, language and metre in oral composition, and reveals readily the passages in the epic which are composed

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in a simple, normative style. Still needed are the actual analyses of the metrical structure of each half-line and, in particular, an index converting actual word types such as [$\cup$ —] into compositional word types by allowing for the initial and final quality of each word.

These problems are all ultimately soluble, and it is not mere facetiousness to forecast the day when our computer, given its rules under these five headings, could, if wanted, compose Homeric epic not only in an artificial style but in a creative style within the given vocabulary inventory.

It is manifestly necessary that all those who work individually in these undertakings should speak a common language, collate and exchange their results and criticize each other's projects. I hope that this Revue will remain our forum and the Hamburg LfgrE our common touchstone.

Indiana University   Robert R. Dyer
Bloomington, Indiana.

Pour compléter l'article de M. Dyer, notre collègue M. Beattie, de l'Université d'Edimbourg, a bien voulu nous donner les quelques précisions qui suivent:

Professor Dyer's note on the prospects of computerized research on Homer is, I feel, a little premature, at any rate as far as the Edinburgh contribution is concerned.

So far I have received from Mr. Morton a tape of the Homeric
Hymns and of Hesiod's Theogony. The remainder of Hesiod has
not yet arrived, nor have I yet in my possession any parts
of the Iliad or the Odyssey.

When we have the tapes and have edited then we shall cer-
tainly make them available, as Professor Dyer suggests, to
any scholar who wishes to work on Homer and Hesiod. Anyone
who wishes to be provided with copies should write to Mr.
Michaelson at the Department of Computer Science, 7 Buc-
cleuch Place, Edinburgh 8. I would suggest that no applica-
tion should be made before 1st April 1967.

The tapes will be available in ASCII (teletype) code. I be-
lieve that IBM machines of the 360 series will work to this
code. If necessary, Mr. Michaelson can arrange to have texts
transcribed into other codes.

Lines will be numbered in the tapes and the ends of lines
will be marked. Book numbers will also be given.

The texts so far used are for the Homeric Hymns that of Al-
len, Halliday and Sikes, Second Edition (1936) and for He-
siod Theogony Rzach's Teubner edition (1913). We shall have
a list of variant readings and omitted lines added to the
tape in due course. I believe that Mr. Morton in preparing
tapes of the Iliad and Odyssey has used the Oxford plain
texts but I shall verify this as soon as possible.

As Professor Dyer says, the tape contains a plain text with
punctuation but without accents or breathings. Mr. Morton's
practice has been to omit iota subscript altogether, but I
intend to have the subscript shown as an adscript in all the
tapes.

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