

USING dBASE II FOR RETRIEVAL OF RADIOCARBON DATA*

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ABSTRACT. A “C14” data base has been created for internal use of ^{14}C dates with an Osborne-1 system. It uses a CP/M operating system, Z-80 CPU, and dBASE II software program. The structure meets the users’ requirements of information and easy retrieval. The video display is quite compact, as a record of 32 fields is edited to fill a screen of 22 lines. A standard printout is edited to make room for two records per page and contains all information from these records. Searching may take place in all fields or parts of fields, in interval(s) in one or more fields and in various combinations of the prescribed methods of searching. A field called KEYWORDS is established to ease search operations. “C14” may be adapted to individual requirements and equipment with small adjustments.

INTRODUCTION

The “C14” data base has been created for internal use at any institution using ^{14}C dates. The data base may also be used for submitting dates for publication in *Radiocarbon*. It is not linked with other data base systems but has been established to routinely provide a survey of published and unpublished dates.

HARDWARE AND SOFTWARE

We have used Osborne-1 (Ashton-Tate) using a CP/M operating system and Z-80 CPU. We use dBASE II—a fourth generation programming language.

Each record in dBASE II has a limit of 32 fields and each field is limited to 254 characters. The maximum number of characters per record is 1000. Five 1/4” diskettes are used. They can hold ca 200,000 characters. Each of the records in our “C14” data base has 1000 characters. Thus, one diskette may hold ca 200 records, but we have chosen to fill up 2/3 of each diskette to allow for manipulation of the data base, such as sorting files and extracting data to temporary files. In order to get an overview of more than one diskette at the time, a hard disk is required.

STRUCTURE

The structure of the data base is derived from a specific form used by submitters and the Radiological Dating Laboratory, Trondheim, Norway, upon publication of a ^{14}C date in *Radiocarbon* (Fig 1). This form has been revised, taking into consideration the multidisciplinary background of the users of ^{14}C dates, and adapted to fit dBASE II. The structure (Fig 2) has 32 fields, which forms one record and is appropriate for our use as well as an up-to-date international record. Some submitters have particular interests which we assume, can be adapted to a relatively large field of keywords for a wide variety of subjects. ^{14}C laboratories need to store specific information, eg, amount of gas measured, and pretreatment of the samples. We propose that the laboratories maintain an extra record for each date in a secondary

*This poster presentation was made at the 12th International Radiocarbon Conference, June 24–28, Trondheim, Norway.

Lab. referanse Laboratory reference	Returneres til Laboratoriet for Radiologisk Datering med nødvendige opplysninger - maskinskrevet på engelsk - når publikasjon i RADIOCARBON ønskes		Alder B.P. Age B.P.
Egen referanse Submitter's reference			Periode, sone Period, zone
Innsendt av (navn, institusjon) Submitter (name, institution)			Arstall Year
Funnet av (navn, institusjon) Collector (name, institution)			Arstall Year
Funnsted (stedsnavn, kommune, fylke) Site (place, municipality, county)	Greenwich koord. Greenwich coordinates	Høyde o.h. m a.s.l.	
Nærmere beskrivelse av funnforhold Description of site		Prøvematerialets art Material	
<p style="text-align: center;">Return to Radiological Dating Laboratory with all necessary information typed in English, when publication in RADIOCARBON is desired</p>		Dybde under overflaten Depth below surface	
		Bortype Type of sampler	
		Oppgitt antatt alder Estimated age presupposed	
Datering is Datering er	Proposed name of publication	Denne datering Name upon publication of this dating	
single enkeltstående	Forslag til publikasjonsnavn	Serien Name upon publication of this series	
one of a series ledd i en serie			
Opplysninger om serien, (gis for en av dat. i serien; vis senere til denne) Information about this series (is given for one of the datings in the series, reference to be made to later)			
Kommentar/konklusjon (f.eks. overensstemmelse med antatt alder og/eller andre dateringsmetoder) Comments/conclusions (e.g. accordance with estimated age and/or other dating methods)			
Litteraturreferanser (forfatter, årstall, tittel, tidsskrift, vol., no., sidetall) Literature (author, year, title, periodical, vol., no., pages)			

Fig 1. The form used at the Radiocarbon Dating Laboratory, Trondheim, Norway, upon publication of a ^{14}C date in *Radiocarbon* with our English translations

file containing such data that can be used with the main data base to solve this problem.

VIDEO DISPLAY

The 32 fields that make up a record are edited to fill a screen of 22 lines (Fig 3). The principal information can be easily seen. Some fields are joined to give the illusion of one field on the screen. The video display is quite compact as we have stretched dBASE II to its limits.

FLD	NAME	TYPE	WIDTH
001	LABREF	C	008
002	OWNREF	C	014
003	MUSNO	C	013
004	C13	C	005
005	MATERIAL	C	014
006	AGE	C	015
007	MASCA	C	015
008	PERIOD	C	027
009	ESTIMAGE	C	011
010	WEIGHT	C	005
011	KEYWORD1	C	065
012	KEYWORD2	C	055
013	SUBMITYEAR	C	024
014	INSTITUTE	C	015
015	SITE	C	015
016	MUNICIPAL	C	016
017	COUNTRY	C	005
018	COUNTRY	C	003
019	COORD	C	010
020	ALTITUDE	C	004
021	DEPTH	C	009
022	SINGLE	L	001
023	SAMPNAME	C	020
024	SERNAME	C	030
025	DESCRIP1	C	075
026	DESCRIP2	C	075
027	DESCRIP3	C	075
028	SERINF01	C	075
029	SERINF02	C	075
030	SERINF03	C	075
031	COMCONC1	C	075
032	COMCONC2	C	075
** TOTAL **			01000

Fig 2. The structure

PRINTOUTS

A small program has been implemented for a standard printout of the entire contents of each record, two per page (Fig 4). This program has been designed for FACIT 4510/4512 printers; with modifications, it may also be adapted to other printers. Editing resulted in five blocks of information: 1) sample numbers, ages, and material; 2) keywords; 3) submitter and geographic location of sample; 4) name of site and series; 5) description, comments, and references.

The last eight fields of the structure contain descriptive text which is printed out as if it were free text. Searching is possible in the fields of descriptive text as if they were one field. Gulliksen (1983, p 662) asked ^{14}C users of dates produced by the Trondheim ^{14}C laboratory to suggest parameters that ought to be available in his planned data base. Such a variety of terms were offered that he decided to work out a system capable of searching in free texts.

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LABREF:                               AGE:
OWNREF:                               MASCA:
MUSNO:                                PERIOD:
DELTA C13:                            ESTIM. AGE:
SAMPLE:                               WEIGHT:
KEYWORDS:

SUBMITTER, YEAR:                      INSTITUTION:
SITE:                                 MUNICIPALITY:
COUNTY:                              COUNTRY:
COORD:                                m a.s.l.: DEPTH in cm:
SINGLE SAMPLE (Y) OR ONE IN A SERIES (N):
NAME UPON PUBLICATION OF THIS DATING:
NAME UPON PUBLICATION OF THIS SERIES:
1.DESCRPTION, 2.SERIES INFO, 3.COMMENTS-CONCLUSION, 4.LITERATURE:

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Fig 3. The video display

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LABREF: T-2071                AGE BP: 1120+-90
OWNREF: 1ok7SBA2.K3011       MASCA:
MUSNO: S.9934y               PERIOD: Late Iron Age
DELTA C13:                    ESTIMATED AGE BP: 4000
MATERIAL: charcoal           WEIGHT g: 6.1

KEYWORDS: Late Mesolithic, Neolithic and Late Iron Age settlement, inner
fjord district, summer-farm area

SUBMITTER and YEAR: S Bang-Andersen 1974    INSTITUTION: Ams

SITE: Mosvatnet                MUNICIPALITY: Suldal
COUNTY: Rog                  COUNTRY: N
GEOGR COORD: N5925E0626 m a.s.l.: 520     DEPTH in cm: 10-15

SINGLE SAMPLE (Y) OR ONE IN A SERIES (N): N
NAME UPON PUBLICATION OF THIS DATING: Mosvatnet
NAME UPON PUBLICATION OF THIS SERIES: Stone age mountain settlement

1.DESCRPTION, 2.SERIES INFO, 3.COMMENTS-CONCLUSION, 4.LITERATURE:
1) Loc 7, an open dwelling site containing archaeological finds from
Mesolithic per. Neolithic per and Late Iron Age. Samps collected from
bottom of undistinct hearth in upper part of cultural layer. Horizontal
extends of sample area 25 x 25 sqcm. 2) cfr T-1811. 3) Sample context
was presumed to be of Neolithic Age, although this could not be confirmed
during the excavation. Dating result proves that the hearth belongs to the
Iron Age settlement. 4) Bang-Andersen, S 1974: Lokaltet 7-en steinalder
hoplass ved Mosvatnet i Suldalsheiene.-Fra Haug ok Heidni 5, p 196-202.

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Fig 4. The printout

In our opinion, searching in free texts does not solve the problems described by Gulliksen. Terminology varies for different groups of users, eg, the same phenomenon may be described by several synonyms. To ensure complete retrieval of relevant information, Gulliksen (1983, p 662) defined macros, or groups of synonyms that can be used for retrieving documents in which at least one of the words appears. To avoid such free text searching, we have expanded the field, KEYWORDS, to provide more space for words precisely describing the dates. This expansion has been made at the expense of the descriptive text.

Printouts may be designed according to individual needs by using the command, REPORT. This command offers innumerable possibilities for printouts on various conditions in practically unlimited combinations of data.

THE SEARCH

The "C14" data base is entered without a password, but a password may be established, if desired. Abbreviations listed in Kra (1984, p 157) are used in addition to others. Abbreviations for countries are those used internationally on motor vehicle license plates.

The search may contain conditions that are different combinations of various fields combined with logical operators such as AND, OR, NOT, >, =, <. All fields and parts of fields can be used in search operations. Commands like LOCATE, DISPLAY, CONTINUE, COUNT, LIST, REPORT, and GO TOP are often used. For further detailed use of commands, see dBASE II manual (1981).

dBASE II offers a wide range of search possibilities: searching in any number of fields, searching in any part of a field or in two or more parts of the same field, searching for an interval in one field or intervals in two fields, and searching in various combinations of the described search operations.

CONCLUDING REMARKS

The "C14" data base program may be adapted to individual requirements and equipment with minor adjustments. In our opinion, dBASE II meets the requirements of a ¹⁴C data base in a satisfactory way. The equipment and knowledge required to create and operate the "C14" data base are reasonable investments and adequately serve the needs of the radiocarbon community.

ACKNOWLEDGMENTS

We offer our sincere thanks to Else Iren Bjørkhaug for typing the manuscript, Jan Mellemstrand for correcting the English, and our colleagues at the Arkeologisk museum i Stavanger for contributing with useful improvements to the "C14" data base.

REFERENCES

- 1981, dBASE II manual: Osborne Computer Corp, Hayward, California.
Bengtson, P, 1978, Guidelines for authors: Geol Fören Stockholm Förh, v 100, no. 1, p 7–17.
Gulliksen, S, 1983, Radiocarbon database: A pilot project, *in* Stuiver, M and Kra, R S, eds, Internatl ¹⁴C conf, 11th, Proc: Radiocarbon, v 25, no. 2, p 661–666.
Kra, R S, ed, 1984, *Radiocarbon* style guide: Radiocarbon, v 26, no. 1, p 152–158.