Struhsacker

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL DATA SERVICE

National Geophysical and Solar-Terrestrial
Data Center (D62)
Boulder, Colorado 80303

GL04208

1978 (W)

Announcement of Availability
of Geology Data

PETROS

A DATA BANK OF MAJOR-ELEMENT CHEMICAL ANALYSES OF IGNEOUS ROCKS

(Version 4.1 - April 1978 Update)

Compiled by
F.E. Mutschler, D.J. Rougon, O.P. Lavin, and R.D. Hughes

PETROS is a major historical data bank of chemical analyses of igneous rocks. Compiled at Eastern Washington University, the data file is being distributed on magnetic tape by the National Geophysical and Solar-Terrestrial Data Center (NGSDC). The April 1978 updated version of PETROS includes 34,829 major-element-chemical analyses of igneous rocks collected worldwide (see fig. 2). They are divided into 246 groups representing geographic areas or petrologic provinces. Also included are 486 calculated average rock compositions.

Analyses in PETROS include percentages of SiO_2, Al_2O_3, Fe_2O_3, FeO, MGO, CaO, Na_2O, K_2O, H_2O+, H_2O-, TiO_2, P_2O_5, MnO, ZrO_2, CO_2, SO_3, Cl, F, S, Cr_2O_3, NiO, BaO (fig. 1, parameter K). At least nine of these major oxides were determined for each analysis contained in PETROS. The data file also includes: a) reference (author, date); b) geographic or petrologic province; c) latitude and d) longitude to the nearest degree; e) rock name; f) geologic age by era, period, or epoch; g) type of igneous rock body in which the sample occurs (flow, pyroclastic, plutonic, altered, etc.); h) author's analysis number; i) analytical information; and j) sample number in PETROS file.

```
            a                    b       c    d                e                  f  g       h       i     j
 BARBERI +        (1970) AFR.         .14 041E PICRITIC BASALT                       F       D 12        0000200
   44.01 13.75   5.42   5.56 10.04 11.53   2.60   0.80   2.57   0.51   2.34 ┐
    0.48  0.20     .      .     .     .      .      .      .      .      .  ┘ k
 BARBERI +        (1970) AFR.         .14 041E PICRITIC BASALT                       F      CH50         0000300
   48.10 13.20   2.45   8.11 10.13 12.06   2.45   0.35   1.04    .     1.45
    0.24  0.17     .      .     .     .      .      .      .      .      .
 BARBERI +        (1970) AFR.         .14 041E BASALT                                G      F 98         0000400
   46.20 13.35   5.42   9.03  8.81 10.75   2.60   0.43   0.55   0.58   1.74
    0.34  0.15     .      .     .     .      .      .      .      .      .
```

Figure 1. Data Format

The tape includes a second file, MARTHA, following PETROS. MARTHA consists of a description of the organization of data bank PETROS, a list of sample identification formats and codes, bibliographies listing the sources of analyses for each major group in PETROS, and a listing of operating instructions for the data bank.

Sources of data for PETROS include published works and theses. Errors discovered in the data were rechecked with the source, when possible. Studies with gross, unresolvable errors were not included. PETROS is designed for successive growth as the literature search continues, and will be updated periodically as new data are published. For further details, see Mutschler and others (1976)* and Barr and others (1977)**.

The PETROS data bank is available on 7- or 9-track coded magnetic tape, at any compatible density, with a logical record length of 80 characters. Please specify blocked (5120 characters or less) or unblocked. Documentation file MARTHA is provided in print form and also appears in text form after the PETROS file on the tape. Price: $60 per tape.

Please make check or money order payable to "Commerce/NOAA/NGSDC."

Inquiries should be addressed to:

National Geophysical and Solar-Terrestrial Data Center
NOAA/EDIS, D621
Boulder, Colorado 80303, U.S.A.

Telephone: (303) 499-1000, ext. 6338; FTS 323-6338

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*Mutschler, F.E., D.J. Rougon, and O.P. Lavin, "PETROS-A Data Bank of Major-Element Chemical Analyses of Igneous Rocks for Research and Teaching," Computers and Geosciences, vol. 2, pp. 51-57, 1976.

**Barr, D.L., F.E. Mutschler, and O.P. Lavin, "KEYBAM-A System of Interactive Computer Programs for Use with the PETROS Petrochemical Data Bank," Computers and Geosciences, vol. 3, pp. 489-496, 1977.

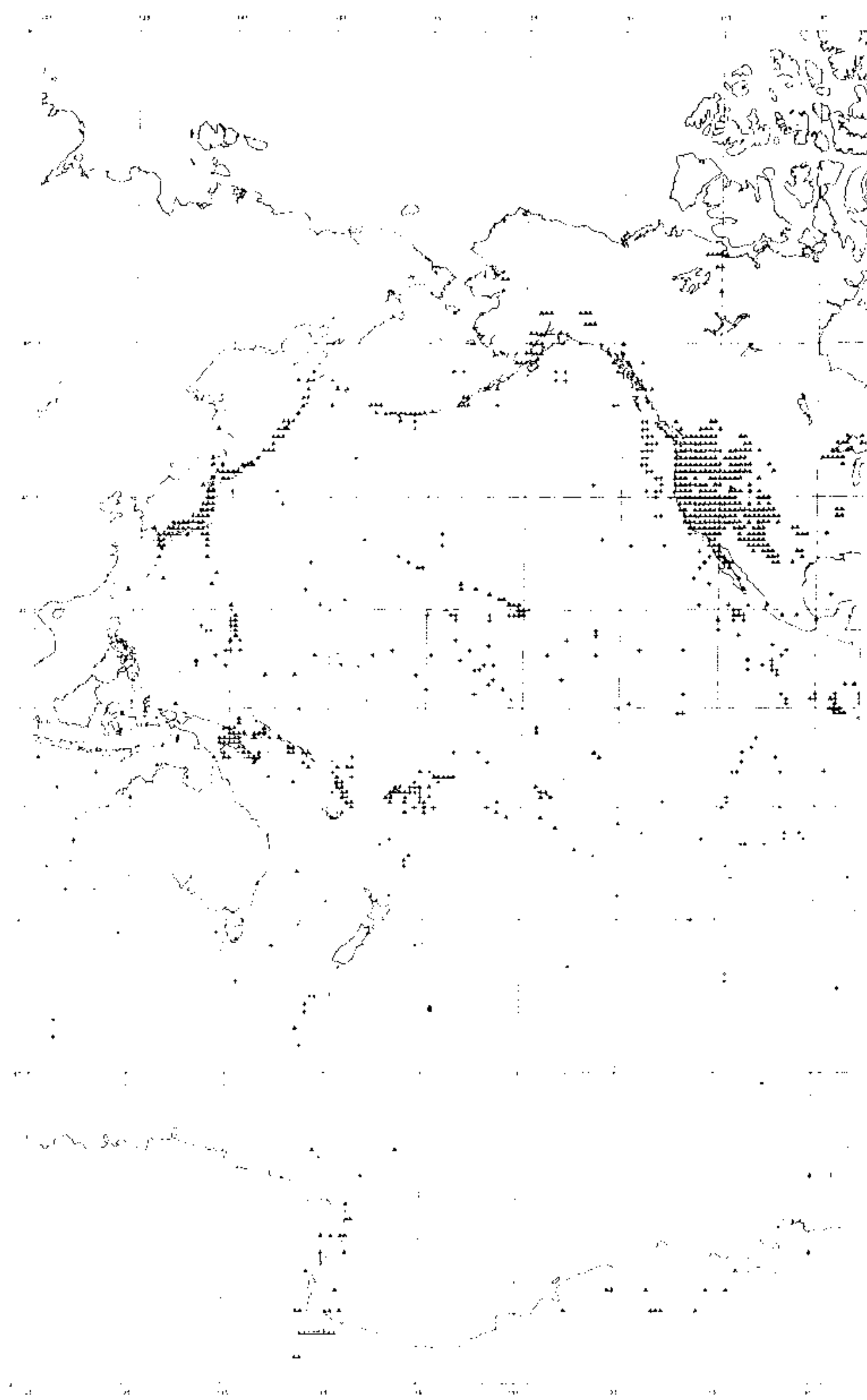
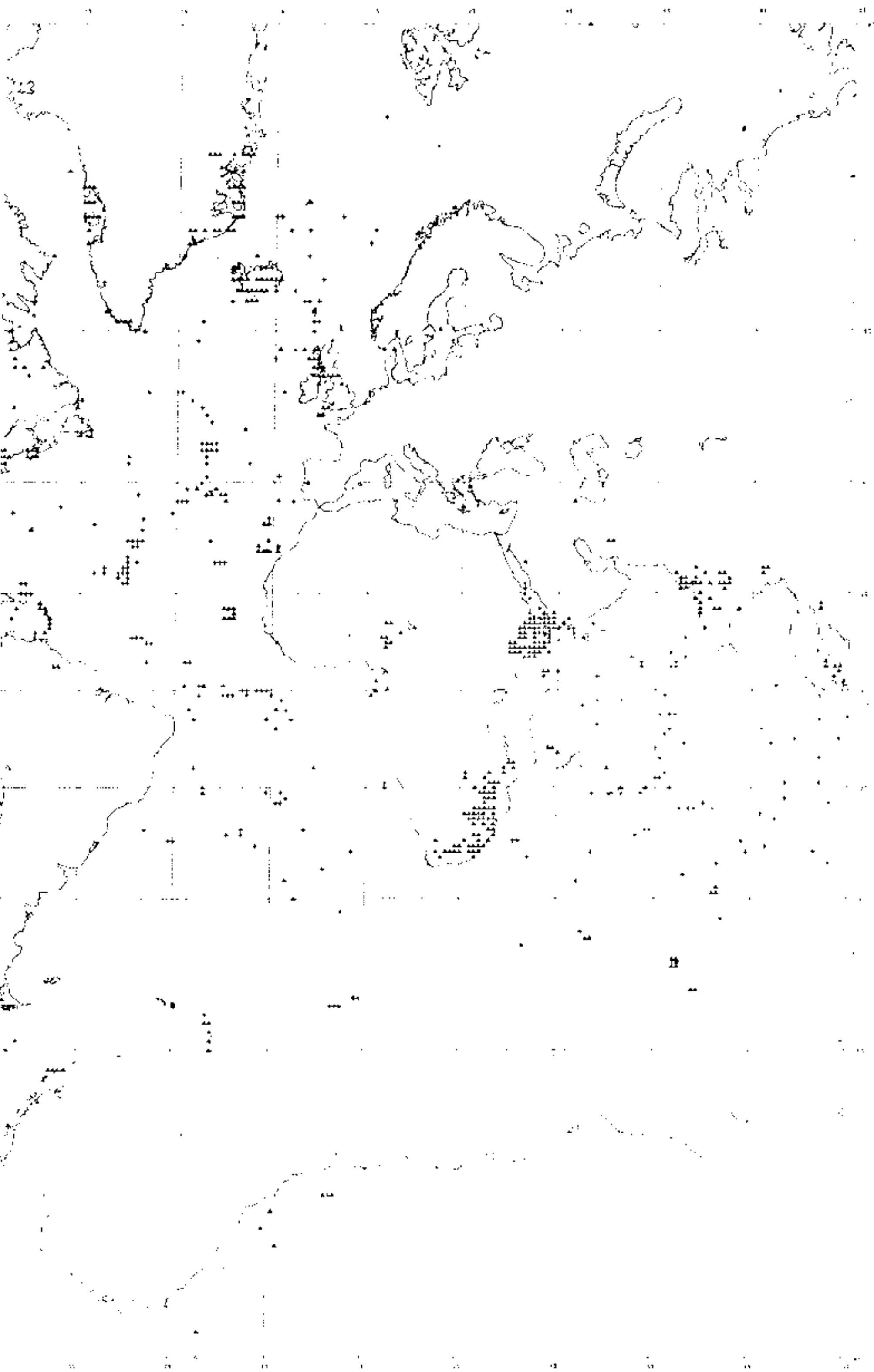


Figure 2. Sample locations for PETROS. Triangles repres
are reported to the nearest degree; each symbo



d samples; crosses represent ocean-floor samples. Positions
epresent more than one sample.

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

Circular 78-3D
IGCP-163-IGBA
Second Printing

May 10, 1978

Card Format for Copy Submitted on Version JAN78 of the IGBA Coding Form

Contents

Abstract

Specimen descriptions extracted, in the fashion described in "Notes on the IGBA coding form', from a set of references listed on a 'Group Title-and-Reference' sheet of that form comprise a single logical record of the base, and are processed as a group. This document describes both the format to be used at the central office in moving such data from coding forms to punched cards and the much simpler format for carding the bibliography listed on the Group Title-and-Reference sheet.

The central office is preparing to process data submitted in card decks or card-image tapes formatted as described here. Ultimately, it is hoped, most data transmission between central office, regional offices, and favorably situated contributors will be in this latter form. Experimentation along these lines will be initiated as soon as convenient. (Responsibility of the central office for processing coding forms submitted by contributors or national groups not affiliated with a regional office of course continues.)

Please direct correspondence concerning this circular to:

Felix Chayes, Chairman
IGCP Project 163
Geophysical Laboratory
2801 Upton Street, N. W.
Washington, D. C. 20008
U. S. A.

* * *

I. Card Identifiers and Sequence Markers.

The first 6 characters of each card of a data deck are reserved for identification. The identification field is divided into 3 sub-fields, as follows:

Column(s)	Contents of sub-field
1-3	The record identifier; an alphabetic symbol of 1 to 3 letters, right justified. All cards of a particular logical record contain the same record identifier. (Letters only. No digits).
4-5	The specimen identifier; an alphabetic symbol of 1 or 2 letters, right justified. All cards of a particular specimen description carry the same specimen identifier. (Letters only. No digits.)
6	The card sequence symbol; a one-character symbol which may be either of the numerals 1 or 2, or any letter of the Roman alphabet. The within-specimen order of card sequence symbols is the same for all specimens.

The record preface consists of two cards, the first bearing the card sequence symbol '1', the second the card sequence symbol '2'. The first card of a specimen-description contains the sequence symbol 'A', the second 'B', the third 'C', etc., for as many cards as may be necessary.

Record identifiers and specimen identifiers may occur in any order, but card sequence symbols follow a fixed order in every logical record, viz 1, 2, A, B, ..., A,B, . ., A, B, . . . etc.

To avoid duplication, assignments of record identifiers will be made by the central office, on request. Specimen identifiers are to be assigned by the contributor.

II. Record Preface Cards

1.) The Record Title Card (A3,2X,75A1)

Col.	Variable	Definition
1-3	RS	record identifier
4-5	Blank	
6	CS=1	keys a title card
7-80	TITL	up to 74 characters, free field

2.) The record reference and location card (A3,2X,A1,4X,2(I3,A1),12A1, 10I5)

Col.		
1-3	RS	record identifier
4-5	Blank	
6	CS=2	keys a loc-ref. card
7-10	not used	
11-13	LAT	latitude, to nearest degree, north of most northeasterly specimen
14	LA	either 'N' or 'S'
15-17	LON	longitude, to nearest degree, east of most northeasterly specimen
18	LO	either 'E' or 'W'
19-30	KTRB	contributor's surname, initial(s)
31-35	NREF(1)*	index no. of 1st source reference listed on group title sheet.
36-40	NREF(2)	2d ref
.	.	. use only as many
.	.	. as needed. Leave
.	.	. rest blank.
76-80	NREF(10)	10th ref

---

*On request, a contributor will be assigned a range of index numbers he may attach to references cited. Please use only index numbers in the range allocated to you by the central office.

III. Specimen description cards

Col.	Variable	Definition
(1)	The name and unit card	(A3,A2,A1,2(F6.3,A1),60A1)
1-3	RS	record identifier symbol
4-5	IS	specimen identifier symbol
6	CS	card sequence symbol ('A')
7-12	SLAT	1000*(latitude to nearest decimal part of degree, as available)
13	SLA	'N' or 'S'
14-19	SLON	1000* (longitude to nearest decimal part of degree, as available)
20	SLO	'E' or 'W'
21-44	LTNA	name of rock, as given in source reference
45-80	GLUN	geologic unit from which spec. was collected, as specified in source reference

(2) The essential oxide card (A3,A2,A1,I3,1X,14I4,15,9X)

Col.	Variable	Definition
1-3	RS	record identifier symbol
4-5	IS	specimen identifier symbol
6	CS	card sequence symbol ('B')
7-9	NOREF	sequence no. of ref. on group title sheet
10	Not used	
11-14	NWT(1)	SIO2*100, right justified†
15-18	(2)	TIO2 " " "
19-22	(3)	AL2O3 " " "

†Retain trailing blanks to .00%; e.g., transcribe 2% of TiO_2 reported in the source table as '2.00' by

15	16	17	18
	2	0	0

but 2% reported there as '2.0' by

15	16	17	18
	2	0	

.

23-26	(4)	FE203*100, right justified
27-30	(5)	FEO " " "
31-34	(6)	MNO " " "
35-38	(7)	MGO " " "
39-42	(8)	CAO " " "
43-46	(9)	NA2O " " "
47-50	(10)	K2O " " "
51-54	(11)	P2O5 " " "
55-58	(12)	CO2 " " "
59-62	(13)	H2O+ " " "
63-66	(14)	H2O- " " "
67-71	(15)	Author's total "
72-80	Not used	

(3) Character input card(s) (A3,A2,75A1)

Col.	Variable	Definition
1-3	RS	Record identifier symbol
4-5	IS	Specimen identifier symbol
6	CS	Card sequence symbol ('C','D', 'E', etc., in order).
7-80	NKIF	Character input, defined internally by punctuation, see below.

(4) The end-of-deck card - cols 1-6, inc., of this card must be blank.

IV. Encoding optional data from Blocks C-H inc., of the IGBA data form.

Specimen description cards with sequence symbols >B contain all the literals circled and information entered in Blocks C-H, inclusive, of the coding form. The information in each block is entered in what is called here a 'list'. These lists may vary greatly in length within and between specimens, and some or even all of them may be lacking in any particular specimen description. The only efficient way to read this section of the specimen description is as a character string separated into lists, fields and subfields by punctuation characters. From the main identification field, cols 1-6 of every card, the card inspector 'knows' what record and item it is scanning, and from the sequence of punctuation characters bounding current fields and subfields of the character string it 'determines' the nature of the information currently awaiting interpretation.

A full description of the grammatical conventions by which this last is accomplished makes very dull reading indeed, but there is no help for it, and in practice the system is easy to use. (It is in fact much easier to use than to write or read about!)

1. Punctuation

a. The list separator - The colon separates and identifies lists. Every list ends with a colon, and each list but the first also begins with a colon. The sequence of lists is -

1. the status symbol list
2. the trace element and component list
3. the geological age list
4. the petrographic descriptor list
5. the mineral association list
6. the additional notes list

The processor keeps track of its position by a count of colons. Only if it has counted 3 colons, for instance, will it properly interpret and test a field of petrographic descriptors. If one of the leading colons is missing, the petrographic descriptors will be considered geologic age symbols, and will be rejected as 'unknown'. If two of these colons are missing, the processor will try to identify the petrographic descriptors as trace elements, with the same disastrous result. If all subsequent lists are empty, however, only the terminal colon of the last non-empty list need be used. If, for instance, only the petrographic list was used in a particular description, the sequence

: : : PET. DESC-SYMBOLS :

would be sufficient.

b. <u>The field separator</u> - The semicolon partitions certain lists into fields. In some lists this is unnecessary; the petrographic descriptor list, for instance, consists of a single field divided into as many sub-fields as there are circled symbols in block 'E' of the form. In the trace element list, on the other hand, each of as many fields as there are occupied columns in block 'C' contains 3 sub-fields, of which one may be implicit. (The most complex field partition occurs in the age list.)

c. <u>Sub-field separators</u> - Hyphens, commas, slashes or relational operators (>,=,<) may be used to partition fields into sub-fields. In context, the choice of sub-field separator is usually self-evident; sub-field separators are described below in the discussions of the lists in which they are used.

2. The status list (Block H)

This list precedes the first colon on a "C" card. It consists of a series of 2-character symbols separated by commas. The symbols are those circled in the column at the left edge of the first face of the specimen coding form, all of which are described on p. 6 of 'Notes on the IGBA form'. In each, the first character is a digit, the second a letter. For example:

4A,1A,2B,4F,3C:

is a valid status list. Order of mention of symbols in the list is immaterial.

3. The trace component list (Block C)

The trace component list lies between the 1st and 2d colons of a specimen description, and is partitioned into fields by semi-colons. The first entry in any field is the name of an element or component, an alphameric symbol containing not more than 4 characters of which the first is a letter. The name is separated by an equality (or inequality) operator from a number, the amount of the component, on which a trailing scale factor may be 'H' or 'P' if the amount is hundredths of a percent, 'B' if it is parts-per-billion. If a scale factor of 'M', or no scale factor, is attached to the amount, it will be considered parts-per-million. If the next separator is a comma, the last entry in the field is an integer that identifies the element of array NREF (see p. 3) that contains the index number of the source reference. If, instead, it is a semicolon, marking the end of the field, or a colon, marking the end of the list, the essential-oxide source reference will be assigned internally as the source of the trace component. For example:

:CL=15;SO3=3P,8;V < 60:

is a valid trace component list indicating that CL=15ppm, SO3=.03%, V < 60ppm, that Cl and V are drawn from the essential-oxide source reference, and that the value for SO3 comes from the reference indexed by element 8 of the reference vector NREF, which might of course also be the essential oxide source reference.

A range may be recorded in two fields, e.g. --

:CL<200;CL>100,6;. . .

The sequence in which the fields occur is immaterial, and their reference subfields are independent. In the example above, the upper limit would be attributed to the reference from which the essential oxide data were drawn, which might or might not be the same as element 6 of the reference vector, the source of the lower limit.

4. The age list (Block D)

An age list lies between the second and third colons of the specimen description. If no information about age is to be entered in the base, no non-blank characters occur between these colons. A non-blank age list is partitioned into fields by semi-colons; a field may be partitioned into sub-fields by any of the characters '-', ' / ', or ','.

a. The stratigraphic age field and its sub-fields. The stratigraphic age field is always the first field of an age list. If no stratigraphic age is given, its absence is recorded by an empty field unless no age data at all are available; in the latter case the whole list is blank, e.g., if the left colon is the origin of the list, the sequence

: :

signifies an empty list, while

:;KKKK;LLL:

signifies a list containing 2 physical or radiochemical ages but no stratigraphic age. If the first ';' is omitted, the processor will attempt to interpret 'KKKK' as a stratigraphic age term. Conversely, because of the leading semicolon, even if 'KKKK' is actually a stratigraphic age term the processor will attempt to interpret it as a physical or radiochemical one.

The first sub-field of a stratigraphic age field may contain either an age noun or an age noun and an age adjective; in the latter case the terms are separated by a hyphen. (If the hyphen is omitted, the entire sub-field will be read as a single word.) These terms are identified internally.*

---

*Only the first four letters of a stratigraphic age term are used or retained by the card processor, but inclusion of the full term on the card is permissible. With three exceptions, any age term in the list on p. 3 of the 'Notes on IGBA coding form' is legitimate. The exceptions are Paleocene, Paleogene and Paleozoic; the first is rendered by 'PALC', the second by 'PALG' and the third by 'PALZ'.

The separator at the right margin of the first sub-field may be a colon, a semi-colon, a slash, or a comma. A slash is used if the succeeding sub-field contains either a calendar date or a second stratigraphic noun or noun-adjective pair defining a range, a comma if the succeeding sub-field is a reference number*, a semi-colon if the reference is implicit and the current sub-field is the last in its field, a colon if, in addition, its field is the last in the list.

Examples

1) :MIDDLE-CAMBRIAN/SILURIAN, 5;
2) :LOWE-PALZ;
3) :1920 AD,8:
4) : 62BC:

Example 1 records an age range, example 2 a single stratigraphic age assignment; examples 3 and 4 are calendar ages of dated flows. The historical era designation (AD or BC) of a calendar age, if present, always follows the date, from which it may be set off by blanks but no punctuation. Unless preceded by a comma, any numeric entry in the first field of an age list will be interpreted as a calendar age. 'Before Present' ages are recorded without literal era-designators, i. e.

:HISTORIC; :HISTORIC/5000: :5000:

are all permissible, terminal punctuation on the first indicating that a physical age field follows.

In examples 1 and 3, specific references (5,8) are cited, In examples 2 and 4 it will be assumed that the age information was drawn from the same source as the essential oxide analysis, and the assignment will be made internally.

Terminal punctuation indicates that in examples 1 and 2 the specimen age list contains at least one more (non-blank) field, but that no further dating is available for examples 3 and 4.

b. The physical age field and its sub-fields. For convenience, all non-stratigraphic, non-calendar age determination procedures are referred to here as "physical". With exception of the magnetic and fission track procedures, those currently recognized are in fact based on radioactive decay schemes. The physical-age part of the age list lies between the semicolon that terminates the stratigraphic age field and the colon that terminates the list. Each field in this part of the age list contains information about one physical age determination and is partitioned into sub-fields by commas, hyphens or slashes (no field contains more than one of each, and only the hyphen is compulsory.)

---

*Here and subsequently, the "reference number" is the integer entered, by the contributor, in the left column of the group reference-location sheet, opposite the source reference. It may not exceed 10.

The first sub-field of a physical-age field contains the age, an integer which may be suffixed by a literal scale symbol. In the absence of a scaling literal, this number will be interpreted as specifying millions of years. Permissible scaling literals and their denotations are:

SCALE LITERAL	AGE UNIT
Y	years
H	hundreds of years
T	tens of thousands of years
M or none	millions of years

The second sub-field, which follows a hyphen, is compulsory. It contains a mnemonic denoting method, of which the following are currently recognized:

C14	-	carbon 14
FSTR	-	fission track
ISKR	-	isochron
KAR	-	potassium argon
MGNT	-	magnetic striping
NDSM	-	neodymium-samarium
RBSR	-	rubidium strontium
UPB	-	lead uranium

The third sub-field, initialized by a slash, contains a literal denoting the name of the material on which the age was determined. This is restricted at present to a single 'word', which must be either the symbol of a mineral name from block F of the coding form, or the literal 'WR' denoting 'whole rock'.

A fourth optional sub-field follows a comma and contains the number of the source reference.* The number cited in Block B will be provided internally if the final sub-field is omitted, i.e., it will be inferred that the physical age was drawn from the same reference as the essential oxide data.

Example

Suppose, for instance, that a zircon U-Pb age of 1053 million years was recorded in the same source reference (say, reference 2 of the title sheet) that contained the essential oxide analysis, and that neither a stratigraphic nor other physical age determination was reported there. The following physical age fields would then be equivalent, the first 2 indicating, by the terminal ';', that further physical age determinations, possibly obtained from other sources, follow:

```
:;1053M-UPB/T1,2;
:;1053 -UPB/T1,2;
:;1053M-UPB/T1:
:;1053-UPB/T1:
```

*As defined in footnote on page 9.

The last form is obviously the most convenient. Other variants will be needed only when the age is not given in millions of years, or was not obtained from the source reference from which the essential-oxide analysis was drawn.

5. The Petrographic Descriptor List (Block E)

This list, lying between the 3d and 4th colons, contains all and only those 2-letter symbols circled in Block E of a specimen coding form. It consists of a single field partitioned by commas into as many sub-fields as there are circled symbols in Block E of the coding form. For example:

:AY,BV,DR,EG,GA,IB,IJ:

and

:BH:

are valid petrographic descriptor lists, as are

:: and : :

The first records that the terms lava, subaerial, amygdular, fine, vesicular and fresh occur in the source reference description of the analyzed specimen, and that, in addition, other terms (IJ), not contained in the system glossary but noted later in Block G, are also used. In the second example, evidently the only source reference term clearly applicable to the analyzed specimen is pillow lava. The last examples record that the petrographic descriptor list is empty; this is necessary only if material from Blocks F and/or G of the coding form is to be included in the specimen description.

6. The Mineral Assemblage List (Block F)

The mineral assemblage list, lying between the 4th and 5th colons, consists of a single field divided by commas into as many sub-fields as there are mineral symbols circled in Block F of the coding form. The first two non-blank characters in each sub-field will be interpreted as a mineral symbol. Any additional non-blank characters in the sub-field will be interpreted as habit flags; these will be present, of course, only if inscribed on the coding form by the contributor. For example, in the list --

:NJ374,OG34, PE, RT:

the first sub-field records the presence of euhedral sanidine in phenocrysts and groundmass; the second records the presence of euhedral groundmass nepheline, the third and fourth fields record the presence of phlogopite and aegerine in the specimen. (Habit flags are defined on p. 4 of 'Notes on IGBA coding form'.)

7. Additional Notes (Block G)

This list, lying between the 5th and 6th colons, is designed to provide maximum freedom for recording information not included in Blocks A-F inclusive. All ASCII characters except the colon (:), dollar ($), sharp (#) and reverse virgule (\ ) are available for general use; the latter three are reserved for editorial control. Their functions are as follows:

The '$' breaks the block into separate messages. Each message is collected into words in which no two non-blank characters are separated by more than one blank.

The '#' reinitializes the within-message character count.

The ' \ ' reinitializes the within-message character count and excludes all subsequent blanks.

The '$' is intended to facilitate printing, and, in this first version of the system, messages longer than 130 characters are illegal.

The '#' and ' \ ' are used to facilitate machine scanning. The first non-blank character following either will be the first character of a word. Either may be used as often as needed in a message.

The additional-notes list may contain up to 500 characters, but this count includes all blanks and editorial control symbols.

Example

:POINT-COUNT MODE IN SOURCE, Q=38, PLAG=45, MI=15. $LINK WORDS,
#IVANOV - BAS532, \ SIMKIN S M123 - 459P:

The distribution of editorial characters in this example would give the following printer retrieval:

POINT-COUNT MODE IN SOURCE, Q=38, PLAG=45, MI=15.
LINK WORDS, IVANOV - BAS532, SIMKINSM123-459P.

The 'link words' in the display are hypothetical examples of those suggested on p. 5 of "Notes on the IGBA coding form".

Contributors and/or regional offices may incorporate local coding in the "Additional Information" list--or in Block G of the coding form--providing the coding conventions they adopt:

(a) are expected to be reasonably stable,
(b) are conveyed to the central office, and
(c) do not employ the ':', '$', '#', or '\' characters.

V. Bibliography

Formally, all bibliography cards are identical, viz.

Col. 1-5 Index number of reference, right justified
Col. 6-80 Text of citation

The same for all cards of a reference, the index number is an integer selected by the contributor from the range assigned by the central office (see footnote on p. 3.)

The reference record is broken into 'author', 'title', and 'publication' blocks. Within each block, the sequence is that currently used in the Bulletin of the Geological Society of America. A slash terminates the first and second blocks. A terminal slash at the end of the third block is optional. No block may contain more than 120 characters.

The first word of the author block is the surname of the senior author. A '$' symbol precedes the surname of each other author. The date of publication is the last information in the author block.

The reference used as a model in the footnote of the 'Group Title-and-Reference' sheet of the coding form is again used as an example here:

EXAMPLE

```
99999COGOLU,E., ET$KRUMMENACHER,D.,1967./PROBLEMES GEOCHRONOMETRIQUES DANS LA PA
99999RTIE NW DE L'ANATOLE CENTRALE (TURQUIE):/SCHWEIZER. MINERAL. U. PETROG. MIT
99999T., V.47, P.825-831/
```

(Each line is a card image.)

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

IGCP-163-IGBA
Circular 79US-2

Next Meeting of the US Group of IGBA

The due date for requests for conference rooms at GSA in San Diego next November was 1 June, not, as announced in the 23 April questionnaire, 30 June! Early response to the questionnaire was unusually heavy, however, with a strong preference for a 2 or 3 hour informal work session. So in mid-May I requested a conference room assignment.

Agenda items currently under consideration are:

1. Status of the group's systematic scan of the US primary literature; and of the base project as a whole,

2. Discussion of the current state of the art of petrographic description as revealed by the US literature scan and other contributions to the base.

3. Information content of the current version of the data form; items requiring clarification. Proposals for additions or deletions, to be reviewed at the next international meeting, or by mail.

4. Experience in moving information from the data form to punched cards or card image files.

There is room for other agenda items, and we are not obligated to use all those listed here. Your suggestions are solicited.

Note for Recipients of this Circular who are not US Nationals

You are cordially invited to attend the San Diego meeting. If attendance would be particularly helpful in connection with your project work, the central office will attempt to provide some assistance with travel expenses. The meeting is not now designated a regular international meeting for the reason that the last international meeting was also held in the US (Syracuse, 1978). Where and when would you like the next international meeting?

Felix Chayes

Felix Chayes
Chairman, Project 163

15 June 1979

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

December 15, 1978

Circular 78-7
IGCP-163-IGBA

Major Results of the Syracuse Workshop*

*   *   *

Introduction

The Workshop was held October 19-20, 1978, in space kindly provided by the Department of Geology of Syracuse University. The following attended:

- D. L. Barr, Cheney, Washington, U. S. A.
- Ed. Bloomstein, Salt Lake City, Utah, U. S. A. (US Steel Research Park)
- J. Brandle, Madrid, Spain
- F. Chayes, Washington, D. C., U. S. A.
- J. Lander, Boulder, Colorado, U. S. A. (Observer)
- J. Marsh, Grahamstown, South Africa
- F. Mutschler, Cheney, Washington, U. S. A.

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*Prepared by F. Chayes with extensive comment and criticism by J. Brandle and F. Mutschler.

Five other participants (one each from Colombia, England, France, India and the U. S.) had firm plans to attend but in the end were unable to do so.

The workshop, designed primarily to review procedures for moving information from data forms to cards or card-image files, also provided opportunity for extended and leisurely review of many of the substantive and procedural problems facing the project. A number of rather important decisions were reached. Balloting was not required at any time, however, so that what follows is a sense-of-the-meeting resumé of some of the major topics considered. Order of mention in this account is influenced more by the general interest of an item than by its position on the agenda. Occasional mention is made of information not available at the time of the meeting.

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The steering committee has assumed from the outset that as national or regional groups were established they would assume responsibility for coverage assignments in their own reference areas, as has in fact happened in Australia, India, Jugoslavia, Spain, Turkey and the U. S. Each such group will be left free to organize and manage this process as it sees fit, with the proviso that every group will welcome contributions from non-nationals and will inform other concerned national groups of extra-territorial coverage provided or requested by its own contributors. Overlaps in coverage are bound to occur when, for instance, rocks from area A are described in journals published in area B, or a contributor residing in area B is interested in rocks occurring in area A. Without overformalizing the allocation of responsibility, we must nevertheless attempt to minimize duplication of effort.

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R. L. Armstrong, Vancouver, B. C.	Cenozoic volcanics of northwestern North America under study at the University of British Columbia.
S. Barr, Wolfville, Nova Scotia	Igneous rocks of Nova Scotia
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J. Gill, Santa Cruz, CA	Fiji, Samoa, Tonga, Kermadec & adjacent sea floor
W. Greenwood, Denver, CO	Idaho batholith
F. Mutschler, Cheney, WA	Deep Sea Drilling Program
J. T. Ray, Grand Forks, ND	Cenozoic volcanics of North Dakota and NE Wyoming
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It was generally agreed that systematic allocation of responsibility for coverage is one of our most critical problems, and that mismanagement of it will be lethal. Most conferees agreed that allocation by publication would be easier to monitor and more efficient than assignment by areas or rock types. This position had been taken earlier by Italian, Belgian and U. S. correspondents, and at the meeting it was reported that the South African group also plans a systematic literature scan. (A letter received 11/6 reports that the Australian group has reached the same decision.) It was then suggested that the U. S. group should begin reorganizing its work along these lines, avoiding, as far as possible, interference with existing assignments. (R. Boutilier had already accepted responsibility for the Bulletin of the Geological Society of America; at the meeting F. Mutschler was assigned the Journal of Geology, F. Chayes, the American Journal of Science, and E. Bloomstein was asked to examine and report on the feasibility of a literature scan for data from Asiatic Russia. U. S. journal assignments will probably be further partitioned into 10-year time blocks; a preliminary scheduling is to be released shortly).

Further discussion of procedures for allocating responsibility for coverage is invited.

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It was pointed out that this definition is arbitrary and in some ways unrealistic. Doctoral dissertations, for instance, can be obtained on request from libraries or departments of most parent universities, though they are not routinely available in the stacks of libraries outside the institution of origin. In the U. S., the more recent "open files" of the USGS are in about the same category with regard to accessibility, except that copies are usually sold at nominal prices rather than loaned. No doubt similar series exist in other countries. This mass of quasi-public information, which is probably increasing much more rapidly than conventionally published material, raises two serious problems for our project:

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The answers to these questions seem to be that (1) our resources are such that for the present and foreseeable future we shall have all we can do to discharge our major assignment, and that (2) we ought not contribute to further deterioration of an editorial process already in serious difficulty with respect to the role and practice of pre-publication refereeing.

The problem nevertheless persists, and so does the pressure for a practical solution. Indiscriminate inclusion of unpublished material is indeed an attack on the conventional publication process, but indiscriminate exclusion of it is often interpreted as an unwarranted reflection on the quality of information that, for one reason or other, has not made its way through that process. A compromise would appear to be in order. At the Syracuse meeting it was agreed that the project should maintain, in a separate base of the same structure as that established for published information, data submitted in IGBA card or card-image format by authors of doctoral dissertations, documents in governmental open files, or other notices not usually stored by reference libraries but obtainable in routine fashion from originating institutions.

Moving Information from Data Forms to Cards

Experience in the central office shows that the existing data form can be used as key punch copy by an interested petrologist familiar with the grammatical conventions of the system, as described in Circular 78-3D. The form probably would also be satisfactory copy for an alert assistant interested in petrology and well trained for the assignment. (A careful test of this possibility is planned for the near future.) There was general agreement, however, that it could not be used efficiently by casual labor and usually would not be accepted as copy for commercial key punching, a service industry in which labor turnover is high.

The central office and most regional offices will probably have to rely on casual labor or occasional commercial punching for most of this work, so the problem of moving information from data forms to cards or card-image files is critical. Three possible solutions were discussed:

1) A conventional line-per-card coding form could be prepared from the completed data form, for use as key-punch copy. This would involve a complete recopy of all data prior to card generation, with attendant increase both in labor charges and in the probability of transcription errors. The use of a second form as interface between the current coding form and cards seems undesirable but may perhaps be unavoidable.

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3) A conventional line-per-card coding form could replace the current form as basic data document for the project. This possibility is also being actively explored.

(Individuals or groups planning to submit data as card or card-image files in the current syntax, grammar and vocabulary of the project are of course under no obligation to use any particular coding form.)

Key Numbers for Rock Names

Where available in precursor systems, rock name has proved to be a common and often a very important sorting criterion. At present we have no system-recognized key numbers for rock names, and routine sorting by name will be impractical or impossible until we do. With petrographic and mineral-assemblage data recorded for each specimen, there is no need for complex, compound names. With perhaps a few exceptions sanctioned by tradition--e.g., olivine basalt, quartz syenite, nepheline syenite--we could do without mineral names as adjectival modifiers. Similarly--again with exceptions for a few traditional terms like "alkali" or perhaps "porphyritic"--we could dispense with nearly all chemical, textural and/or structural modifiers.

It is not the aim of the project to impose any particular nomenclature or classification, existing or novel, on users of the base. The only purpose of a key number is to uniquely index the name, or the nominal part of the name, by which a specimen is denoted in the source reference, and this purpose would be served by any arbitrary numbering scheme. If all key-numbering were to be done in one office, for instance, the numbers could be assigned sequentially, like museum acquisition numbers, or even randomly. With the work spread as widely as possible, however, a common and easily referenced numbering system will be indispensable.

An initial master list of key numbers for rock names is now in preparation and will soon be released. The appropriate key number is to be entered on the data form in block'A', immediately following the literal name. It is to be punched on card 'B' of the specimen description, right-justified to column 76 (see p. 5 of circular 78-3D). Pending distribution of the master list, key numbers will be entered on copy in the central office.

Modifications of the Data Form

a) Referencing of petrographic and mineral-assemblage descriptors

It is anticipated that in the overwhelming majority of specimen descriptions the information recorded in blocks 'E; and 'F' of the data form will be drawn from the same source as that in block 'B'. Since block 'B' is explicitly referenced (by the 'reference no.' entered in block 'A') there will ordinarily be no need for separate referencing of blocks 'E' and 'F'.

When specimens have been restudied, however, the sources of information in blocks 'B', 'E' and 'F' may differ, and that in either 'E' or 'F' may come from more than one source. In such cases, the sequence number of any reference listed on the 'Title-and-Reference Sheet' may be entered to the left of any symbol in blocks 'E' or 'F' of any specimen sheet in a group.

Individual referencing is already available in blocks 'C' and 'D', so that with this change essentially all types of information on the data form may be independently referenced.

Proposed changes in card format that would implement separate referencing of items in blocks 'E' and 'F' are discussed in the concluding section of this report.

b) Extension of the petrographic vocabulary

The descriptors 'carbonatic', 'eutaxitic', hypidiomorphic', 'panidiomorphic', 'prehnitic' and 'zeolitic' are added to the petrographic vocabulary of the system. They will be included in subsequent printings of the data form.

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Similarly, 'albite' is added to the alkali-feldspar group, 'pargasite' to the amphibole group, 'paragonite' to the mica group, and 'picotite' to the spinel group of the mineral name vocabulary.

d) Correction and extension of the mineral habit vocabulary

The terms 'automorphic', 'microlitic' and 'xenomorphic' are added to the mineral-habit vocabulary and the term 'panidiomorphic' is changed to 'hypidiomorphic'.

The mineral habit vocabulary provides the only opportunity for entering information about a specific mineral; it is convenient, if rather jarring, to append to this vocabulary symbols signifying the presence in the source reference of new data about the mineral in question.

The revised list of habit descriptors, incorporating these changes and replacing the list on page 4 of the 'explanatory notes about the data form', is as follows:

A	Accessory
1	Allotriomorphic
1	Anhedral
3	Automorphic
2	Cumulus
3	Euhedral
4	Groundmass
6	Hypidiomorphic
3	Idiomorphic
5	Intracumulus
C	Microlitic
7	Phenocryst
8	Replaced
9	Secondary
6	Subhedral
B	Xenocryst
1	Xenomorphic
D	New chemical analysis in source reference
E	New x-ray structural data in source reference
F	New optical or other physical data in source reference

e) Changes in status indicators

In view of the expansion of the mineral habit vocabulary just described, status indicators '4F', '4G', '4H' and '4I' are no longer necessary. They will not appear on future printings of the status list.

The following new status symbols are added to the list:

3 J - some essential oxides determined by atomic absorption.
3 K - result an average of analyses of 2 or more specimens.
3 L - result one of a group of replicates for same specimen.
3 M - result published as correction of an earlier analysis.

Changes in card format to implement separate referencing of petrographic and/or mineral descriptors.

Occasion for individual referencing of these descriptors will arise only when results of a reexamination of the same specimen, or of minerals extracted from it, are presented in a later publication. The situation is rare and it seems unwise to burden the software and storage requirements of the system with procedures for routinely storing, packing and unpacking the nearly always redundant information about source reference for every petrographic and mineralogic descriptor in every specimen description. The following simple expedient has been incorporated in the current version of the system, and was proposed at Syracuse.

A number entered at the left of a petrographic or mineral symbol on the data form becomes a sub-field of the appropriate descriptor list and will be presumed to apply to succeeding symbols until another numerical sub-field is encountered or the list terminates. Scanning programs will assume the reference number cited in block 'A', i.e., the reference from which the essential oxide analysis was drawn, applies until a number is encountered (or the list terminates).

The major drawback of this procedure is that incorrect referencing will occur if symbols are improperly sequenced. Specifically, if reference numbers prefix certain symbols but not others in a list, the order of occurrence of the symbols on the data form may be inappropriate on the cards. Suppose, for instance, that mineral symbols 'OB', 'OF' and 'OG' are circled on the form, a '2' appears to the left of 'OF', a '47' to its right, and a '1' is entered as reference number in block A.

The unmodified sequence in which the symbols occur on the coding form, viz.,:OB,2,OF47,OG: will lead to the misinterpretation that the presence of mineral OG in the specimen was noted first in reference 2 rather than in reference 1. The list :OB,OG,2,OF47: will lead to correct attribution as will, for example, :OB,2,OF47,1,OG: or :2,OF47,1,OB,OG: (Each explicit reference reduces by one the number of descriptors that may be carried in the list. The current maximum is 15.)

It was objected that the need for rearrangement to avoid misinterpretation makes the passage from data form to card image unnecessarily complex, and that to avoid transcription errors arising from this complexity it might indeed be better to allot storage and modify software to provide for explicit referencing of <u>every</u> petrographic and mineral descriptor. This would surely be so if the need for such independent referencing were frequent. The matter is open for discussion, and comment is invited. In particular, contributors who encounter actual need for independent referencing of petrographic or mineral descriptors are requested to communicate with the central office. Final decisions about system design require better knowledge about the frequency and nature of this requirement than is now available. Pending demonstrated need for a change, the referencing procedure described here will be retained.

* * *

Revised versions of the data form, the explanatory notes, and circular 78-3D are now in preparation. They will be compatible with those now in use. Work currently in progress should be continued with the present versions unless separate referencing of petrographic or mineral descriptors is required or vocabulary changes described in b), c), or e), above, are indispensable. The mineral habit vocabulary described in d) may be used if needed. As noted above, the central office will undertake to add appropriate key numbers to specimen descriptions submitted before general distribution of the project master list of rock names.

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

December 15, 1978

Circular 78-7
IGCP-163-IGBA

Major Results of the Syracuse Workshop*

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The terms 'automorphic', 'microlitic' and 'xenomorphic' are added to the mineral-habit vocabulary and the term 'panidiomorphic' is changed to 'hypidiomorphic'.

The mineral habit vocabulary provides the only opportunity for entering information about a specific mineral; it is convenient, if rather jarring, to append to this vocabulary symbols signifying the presence in the source reference of new data about the mineral in question.

The revised list of habit descriptors, incorporating these changes and replacing the list on page 4 of the 'explanatory notes about the data form', is as follows:

A	Accessory
1	Allotriomorphic
1	Anhedral
3	Automorphic
2	Cumulus
3	Euhedral
4	Groundmass
6	Hypidiomorphic
3	Idiomorphic
5	Intracumulus
C	Microlitic
7	Phenocryst
8	Replaced
9	Secondary
6	Subhedral
B	Xenocryst
1	Xenomorphic
D	New chemical analysis in source reference
E	New x-ray structural data in source reference
F	New optical or other physical data in source reference

e) Changes in status indicators

In view of the expansion of the mineral habit vocabulary just described, status indicators '4F', '4G', '4H' and '4I' are no longer necessary. They will not appear on future printings of the status list.

The following new status symbols are added to the list:

3 J - some essential oxides determined by atomic absorption.
3 K - result an average of analyses of 2 or more specimens.
3 L - result one of a group of replicates for same specimen.
3 M - result published as correction of an earlier analysis.

Changes in card format to implement separate referencing of petrographic and/or mineral descriptors.

Occasion for individual referencing of these descriptors will arise only when results of a reexamination of the same specimen, or of minerals extracted from it, are presented in a later publication. The situation is rare and it seems unwise to burden the software and storage requirements of the system with procedures for routinely storing, packing and unpacking the nearly always redundant information about source reference for every petrographic and mineralogic descriptor in every specimen description. The following simple expedient has been incorporated in the current version of the system, and was proposed at Syracuse.

A number entered at the left of a petrographic or mineral symbol on the data form becomes a sub-field of the appropriate descriptor list and will be presumed to apply to succeeding symbols until another numerical sub-field is encountered or the list terminates. Scanning programs will assume the reference number cited in block 'A', i.e., the reference from which the essential oxide analysis was drawn, applies until a number is encountered (or the list terminates).

The major drawback of this procedure is that incorrect referencing will occur if symbols are improperly sequenced. Specifically, if reference numbers prefix certain symbols but not others in a list, the order of occurrence of the symbols on the data form may be inappropriate on the cards. Suppose, for instance, that mineral symbols 'OB', 'OF' and 'OG' are circled on the form, a '2' appears to the left of 'OF', a '47' to its right, and a '1' is entered as reference number in block A.

The unmodified sequence in which the symbols occur on the coding form, viz.,:OB,2,OF47,OG: will lead to the misinterpretation that the presence of mineral OG in the specimen was noted first in reference 2 rather than in reference 1. The list :OB,OG,2,OF47: will lead to correct attribution as will, for example, :OB,2,OF47,1,OG: or :2,OF47,1,OB,OG: (Each explicit reference reduces by one the number of descriptors that may be carried in the list. The current maximum is 15.)

It was objected that the need for rearrangement to avoid misinterpretation makes the passage from data form to card image unnecessarily complex, and that to avoid transcription errors arising from this complexity it might indeed be better to allot storage and modify software to provide for explicit referencing of every petrographic and mineral descriptor. This would surely be so if the need for such independent referencing were frequent. The matter is open for discussion, and comment is invited. In particular, contributors who encounter actual need for independent referencing of petrographic or mineral descriptors are requested to communicate with the central office. Final decisions about system design require better knowledge about the frequency and nature of this requirement than is now available. Pending demonstrated need for a change, the referencing procedure described here will be retained.

*   *   *

Revised versions of the data form, the explanatory notes, and circular 78-3D are now in preparation. They will be compatible with those now in use. Work currently in progress should be continued with the present versions unless separate referencing of petrographic or mineral descriptors is required or vocabulary changes described in b), c), or e), above, are indispensable. The mineral habit vocabulary described in d) may be used if needed. As noted above, the central office will undertake to add appropriate key numbers to specimen descriptions submitted before general distribution of the project master list of rock names.

UNIVERSITY OF UTAH
RESEARCH INSTITUTE

UURI

EARTH SCIENCE LABORATORY
391 CHIPETA WAY, SUITE A
SALT LAKE CITY, UTAH 84108
801-581-5283

January 5, 1979

Dr. Felix Chayes
Geophysical Laboratory
Carnegie Institution of Washington
2801 Upton Street, N.W.
Washington, DC 20008

Dear Dr. Chayes,

A group of geologists at the Earth Science Laboratory, University of Utah Research Institute, and the Department of Geology and Geophysics, University of Utah, is interested in participating in IGBA. We have been working in the Mineral Mountains of west-central Utah. Most of our work has focused upon the geology of the Roosevelt and Cove Fort KGRAs. We would like to contribute petrochemical data on these areas, if no one else has spoken for them. In addition to having compiled the existing data in the literature, we have some presently unpublished analyses which we could also submit.

In the future, some of us will be working in the various KGRAs in Nevada. Tentatively we are planning detailed studies of the Tuscarora, San Emidio, Soda Lake, Beowawe, and Baltazore areas. We anticipate gathering petrochemical data from these localities, which we could eventually contribute.

Would you please send us some coding forms and complete instructions for their use? Thank you very much.

Sincerely yours,

Debra Struhsacker

Debra Struhsacker
Associate Geologist

DS:srm

cc: D.L. Nielson, ESL
S.H. Evans, Dept. of Geology & Geophysics
W.P. Nash, Dept. of Geology & Geophysics

UNIVERSITY OF UTAH
RESEARCH INSTITUTE

UURI

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801-581-5283

January 17, 1979

MEMORANDUM

TO: D.L. Nielson, S.H. Evans, W.P. Nash

FROM: Debbie Struhsacker

SUJBECT: International Data Base for Igneous Petrology (Project 163 - IGBA)

-I received a letter from Dr. Felix Chayes expressing interest in our desire to contribute data from Roosevelt, Cove Fort and possibly the Nevada KGRAs to Project 163.

-Also enclosed were coding forms, coding form instructions, the minutes of an October 1978 workshop devoted to Project 163 logistics, and a pamphlet (Circular 78-3D) illustrating the correct computer card coding format to be used when proofreading keypunch copy.

-Although the major goal of Project 163 is the compilation of data from published sources readily available to the public, "unpublished" data is welcomed provided that its source is a "doctoral dissertation, document in governmental open files, or other notices not usually stored by reference libraries but obtainable in routine fashion from originating institutions." This type of data will be stored separately in a "Grey File" following the same format as the main data base. I suspect that at least a portion of our contributions will fall into this category.

-Attached please find two types of coding forms, "Group Title-and-Reference Sheet", and a "Specimen Sheet" along with a set of instructions for their use. The Specimen Sheet and its instructions were slightly modified during the October 1978 workshop. Not all of these changes appear on the enclosed forms. Updated versions should be available soon.

-Please send me a tentative list of the items you wish to contribute to Project-163.

-Do we need a meeting to get this project off the ground?

Debbie Struhsacker
Debbie Struhsacker
Associate Geologist

DS:srm

cc: E. Struhsacker
J. Stringfellow

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

January 25, 1980

IGCP-163-IGBA
Circular 80-1

Notes on Preparing and Processing the Project Coding Form

Contents

* * * *

I. Preface

This circular is being sent to all correspondents of Project 163 because of the general interest attaching to Sections II and III. Section IV is directed primarily to currently active contributors; it is an attempt to answer en bloc questions raised by many of them in covering letters accompanying their copy. I have to hope that answers offered earlier in personal letters acknowledging receipt of copy are consistent with those given here! In case of conflict, this circular, being completely public throughout the project, will govern until modified by a subsequent circular. If you have submitted related questions that have not been answered earlier and are not treated here, please resubmit.

II. A Status Report on the Transfer of Data from Hard Copy to Machine Readable Form.

Enthusiasm and willingness to contribute can not be expected to continue at the present level unless the transfer of data from hard copy to machine readable form can be carried through promptly and reliably. The central office is acutely aware that its performance of this pivotal assignment has been less than satisfactory. But things are looking up. A much improved version of our conversational data transfer program has now been brought on line. Transfer of a specimen description by means of this program requires between 2 and 5 minutes, depending largely on how much trace component and radiochemical age data must be processed. Two student assistants are now being trained to use the new program and will soon be working on an hourly basis, for as long as funds are available. Of the approximately 2000 forms submitted to date, nearly 700 have been processed. We hope to dispose of most of the remaining backlog in the very near future.

In anticipation of this happy day, it is time to consider formalizing the next step. The transfer process is followed here by thorough proofing and elimination of (we hope!) all transcription errors. The name of the contributor is included in the electronic record of each contribution; ideally, he or she should have a chance to compare the hard copy with our proofed electronic version before the latter is incorporated in the base. Further, in a completely ideal world, the electronic version should also be checked, item by item, against the source references. We are able to generate well labelled machine output (essentially complete retrievals from a temporary base) that would facilitate these comparisons. How much of this checking do you, as a potential user of the completed base, consider essential? How much of it, as a contributor, would you yourself be prepared to undertake on data you submit?

A complete check would require a major investment in postal charges, much time, and, alas, administrative organization and management of a higher order than we can now afford. But if it is the consensus view of active workers that such a check is essential, we should begin trying to marshall resources that will make it possible. As a practical matter, I suspect we may have to be content with a spot check. Even then, however, we shall have to decide who picks the spots and who makes the checks. Please let me know your thoughts on this troublesome matter, the sooner the better.

III. A Device for Facilitating Selective Retrieval of Data from the "Additional Information" Section, Block G of the Coding Form.

The "Additional Information" block contains data involving terms not recognized by the system, either because they occur so infrequently as not to warrant formal recognition or because they defy reasonably compact codification. (In the older literature, for example, modal analyses qualify in both respects; and although modes are common in more recent work on plutonic rocks, the nomenclature in which they are reported is varied and unstandardized). Block G can of course be retrieved verbatim, but complete retrieval of it for each of a large number of descriptions will usually be uneconomic and often may not be very helpful.

It was strongly urged at the San Diego meeting of the U.S.-IGBA group that a reasonably general, expandable procedure for tagging information of various types stored in Block G should be developed. To accomplish this the scanning program must be able to detect whether information of a particular sort is present, and, if so, where it occurs. The problem is to frame such information with special characters, and to label each frame with an identifying symbol. The following procedure has been adopted:

(1) Biliteral symbols are to be used as tags.
(2) The paired sequence '\\' indicates that the next two characters are such a symbol
(3) The symbol is succeeded by the sequence 'B B . . . B##', the character string, of which only the terminal '##' is required, being the information tagged by the symbol that precedes it.

Thus, the sequence '\\ AA##' indicates that the source reference contains information of the type denoted by 'AA', and the sequence,

'\\ AABB . . . B##'

indicates that 'B B . . . B' is source information of the type tagged by the symbol 'AA'.

At the present writing only 3 tags have been adopted. They are

'LC' - tagging locality information.
'MD' - tagging a modal analysis, and
'SG' - tagging a whole rock specific gravity determination.

The format and length of the information string contained in the frame are unspecified and a frame of any type may occur anywhere in the block.

Each frame uses 6 characters that might otherwise contain data. The present limit on the length of Block G is 500 characters but in no coding form so far submitted does it require more than 300 and the vast majority require less than 100; the loss of 6 characters to each frame thus seems affordable, even if several frames are required in a single description.

Discussion of the tagging procedure is invited. In particular, are there further information categories for which tags should be assigned? Ultimately, a vector of these tags will have to be incorporated in the system vocabulary.

IV. Common Uncertainties about Some Entries in the Coding Form.

1. The 'record location'. - Specimen locations (Block A of the specimen sheet) may be recorded to thousandths of degrees, but latitude and longitude requested on the title-reference sheet of the form are to be given only to the nearest degree northeast of the most northeasterly specimen locality in the record. Don't attempt to pick a central spot, or waste your time computing an average location. The 'record location' is simply the northeast corner of the record area, to the nearest degree.

2. Conventions concerning the names and amounts of trace components. - Nearly all entries in the "name" lines of Block C turn out to be the standard literal symbols of chemical elements. Exceptions are so rare that, in terms of program structure and storage, it seems uneconomic to scan or retain more than 2 characters in the name of any variable in this block. Accordingly, we now convert ZrO_2 to Zr, BaO to Ba, SrO to Sr, FeS_2 to S, etc., and will continue to do so, barring widespread and cogently argued objection. (Trace amounts of CO_2 are not transformed, but the name 'CO2' is translated internally to 'C2'.)

Please note that an amount given in line 2 of this block is stored as an integer, followed by one of the literal scale factors defined on page 3 of circular 79-2. Thus, a value recorded as '.03%' in the source is to be recorded in Block C as '3H' or '3P' if you wish to make the translation, or '.03' if you don't. We ignore the potential ambiguity in '.03H', and enter it as '3H' because no one uses a scale of hundredths of a hundredth of a percent. But there is a real if slight ambiguity in the interpretation of fractional parts per million; we record them as parts per billion, i.e. '5.1M' becomes '5100B', on the assumption that users will regard trailing zeroes in such numbers as spacers. The procedure is convenient, and is now rather deeply embedded in the logic of the provisional base-building software. It may involve occasional loss of information, however, if the source value is, e.g., '5.30 ppm', in which case the analyst evidently means the trailing zero as a number, not a spacer. So far, no actual example has turned up. We feel the occurrence is too infrequent to warrant abandoning the current arrangement. Do you concur? If not, please write, saying why.

3. Age in fractional parts of a million years, Block D.- The physical age of a rock, like the amount of a trace component, is treated as an integer with a trailing literal scale factor, as described on page 5 of circular 79-2. Some authors, however, record tenths of a million years, and contributors should feel free to follow this usage. In transfer to machine readable form these rare occurrences are converted to units of tens-of-thousands of years, with trailing scale factor 'T'. Contributors may wish to help out, and avoid possible editorial errors, by making the transformation themselves, i.e., an age of 57.5 million years may be recorded either as '57.5M' or '5750T', (but not '57.5T'). Trailing zeroes present the same potential ambiguity noted in the preceding paragraph, but here, as there, no actual example has yet been encountered.

4. Modifiers of mineral descriptors (Block F). - The permissible modifiers, described on page 7 of circular 79-2, are to be inserted, as needed, after the circled symbol to which they apply. They may be listed, between the symbol and the mineral name, in any order. Spacing is not critical. No punctuation should be used.

5. Circling the biliteral symbols in Blocks E and F. - We do not use an optical scanner, so the data transfer involves an actual (human) reading of each circled symbol. Please make each circle large enough so that the symbol it encloses is not obscured, even if this means that the bounding line grazes or cuts adjacent symbols. The time required to process a specimen description may be doubled if, as has happened with some otherwise admirably prepared forms, it is necessary for the operator to verify his reading of circled symbols by reference to a blank coding form.

6. Choosing the biliteral symbols in Blocks E and F. - Currently, up to 15 symbols in each block may be selected. In only a corporal's guard of the coding forms so far submitted has either limit been exceeded. In each such case the limit was exceeded because of redundance, i.e. the symbols for both 'mica', and 'biotite' were circled, or those for 'plagioclase','intermediate plagioclase' and 'oligoclase-andesine'. Unless the source description demands it, please do not combine high- and low-level symbols within any category in these blocks. If, for instance, a source description mentions nepheline and says nothing about any other feldspathoid, 'OG' should be circled, but not 'OA', and not both. In general, where there is any choice, please circle only the symbol associated with the more restrictive of any two terms whose relation is hierarchic. This convention will be easy to honor in the mineral descriptor list (Block F), but perhaps not so easy to use with petrographic descriptors (Block E). It is curious that overflow is much rarer, so, from this point of view, the elimination of redundant symbols is less critical, in the petrographic descriptor list.

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

5 February 1979

Dr. Debra Struhsacker
Earth Science Laboratory
University of Utah Research Institute
391 Chipeta Way, Suite A
Salt Lake City, Utah 84108

Dear Dr. Struhsacker:

We are aware of the assignment of your group and welcome your participation on a regional rather than journal basis. The only way we can keep up with the mail is to do a lot of it by form letter. The Jan. 11 notice went to the whole U. S.-IGBA mailing list, including about a dozen others already working on area-or rock-type assignments.

I don't like to seem ungracious, but we use only published or 'gray' material as described on page 4 of circular 78-7. (I'm not sure you received a copy of this, so I enclose one.) If your unpublished material satisfies the availability criteria described at the top of page 5, it should be submitted. Otherwise not.

Sincerely yours,

Felix Chayes

Felix Chayes

FC:mm
cc: Dr. F. Mutschler
P.S. New coding forms and instructions will be mailed out in the 2nd half of the month.

F. C.

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

IUGS UNESCO IGCP

11 January 1979

MEMORANDUM FOR: Correspondents of U. S.-IGBA Group

Subject: A Projected Sweep of U. S. Primary Literature

From: F. Chayes and F. Mutschler

The purpose of this memorandum is to organize a sweep of major U. S. periodical and occasional literature with minimum investment of time per individual contributor. Working with very limited administrative funding and no administrative staffing, we decided the most efficient way to do this would be to partition the literature assignments among U. S. correspondents who have expressed an interest in the work but are not currently handling specific rock-type or area assignments. Hence the accompanying schedule and reply sheet. Please examine the schedule and return the reply sheet, appropriately marked, to either of us.

It is the firm policy of the central office to minimize busy work, but an explicit reply to this memorandum would be very helpful, whatever its message. Please mark and return the reply sheet now. Thank you.

Felix Chayes

Felix Chayes, Chairman

F. Mutschler

Felix Mutschler, Secretary

P.S. A few of you may have been assigned journals other than those you thought you were already doing, and may note others doing what you wanted to do. Please forgive us. We'll try to keep better records in the future, starting right now!

Replied 1/16/79
(sent Xerox of original letter of 1/5/79, stating preference for Utah-Nevada KGRAs)

Publication	1918-31	1932-43	1944-55	1956-67	1968-79
American Journal of Science	D. Barker	D. W. Fiesinger	H. O. A. Meyer	T. L. Simkin	S. Udansky
American Mineralogist	J. C. Butler	M. Fukui	G. L. Millhollen	G. L. Snyder	D. Wones
Bulletin, Geol. Soc. Amer.	R. Boutilier	M. Garcia	B. J. O'Connor	D. C. Stewart	
Bulletins, U. S. Geol. Survey	M. Beeson	M. L. Keith	D. Peck	M. F. Sheridan	
Economic Geology	K. Bladh	W. D. Kleck	T. L. Robyn	D. B. Slemmons	
Journal of Geology	J. G. Campbell	S. J. Kozak	W. Romey	S. Stow	
Memoirs, Geol. Soc. Amer.	F. Chayes	W. L. Mansker	D. Rubel	D. A. Sundeen	
Prof. Papers, U. S. Geol. Survey	J. W. Creasy	D. McIntyre	R. R. Schwarzer	J. R. Townsend	

International Geological Correlation Program

9 February 1979

Memorandum for: U. S.-IGBA Group

Subject: Assignments for systematic literature scan

This is to thank you for your gratifying response to our memo of Jan. 11th, and to explain in a little more detail our plans for the immediate future.

Of a total of 40 time-publication blocks, 34 were provisionally assigned in the Jan. 11 schedule. Contributors assigned to 4 of these blocks have been obliged to withdraw because of the pressure of other work, 3 unassigned or otherwise assigned contributors requested specific assignments, and two contributors requested reassignment because of limited local library facilities. With changes to accommodate all such requested modifications, we now have 23 of the original 34 blocks firmly assigned, as indicated on the new schedule, of which a copy is enclosed. If you requested assignment, reassignment (or deassignment), please examine the schedule and inform us about the suitability of your new assignment. If your name appears in parentheses on the new schedule, you have not (as of Feb. 9) responded to the memo of Jan. 11. Non-response by March 1 will be taken as evidence of complete disenchantment, but we would prefer explicit information from you before dropping your name from the scanning group.

During February, those who have agreed to participate in the systematic literature scan will receive supplies of data forms and instruction manuals. The immediate assignment is to mark up these forms and mail them to the Washington, (D. C.) office, where they will be carded and machine edited. Proof will be returned to you for final substantive checking.

If enough of you respond promptly--and we hope you do!--the central office will be buried in a paper storm. If you are able to move the data from coding forms to cards or card-image files yourself, please inform the D. C. office; instructions for doing this by key punch, or conversationally via not quite satisfactorily debugged Fortran IV programs, will be made available to anyone willing to use either or both on project work.

* * *

Some respondents have pointed out that the assignments vary widely in work load. If you run out of work, ask for more! If you've been given more than you can afford the time to do, let us know and we'll attempt to relieve you. (Incidentally, it is not too late to join the scanning group, if you are interested in doing so.)

Again, many thanks for your response and interest.

Felix Mutschler — Felix Chayes

9 February 1979

Publication	1918-31	1932-43	1944-55	1956-67	1968-79
American Journal of Science	D. Barker	D. W. Fiesinger	(H. O. A. Meyer)	J. Dickey	S. Udansky
American Mineralogist	J. C. Butler		J. T. Ray		(D. Wones)
Bulletin, Geol. Soc. Amer.	R. Boutilier	M. Garcia	(B. J. O'Connor)	D. C. Stewart	
Bulletins, U. S. Geol. Survey	W. Greenwood	M. L. Keith	K. Bladh	M. F. Sheridan	
Economic Geology	M. Fukui	(W. D. Kleck)	(T. L. Robyn)	(D. B. Slemmons)	
Journal of Geology	(J. G. Campbell)	S. J. Kozak	W. Romey	S. Stow	
Memoirs, Geol. Soc. Amer.	F. Chayes	W. L. Mansker	D. Rubel	D. A. Sundeen	
Prof. Papers, U. S. Geol. Survey	J. W. Creasy	D. McIntyre	(R. R. Schwarzer)	(J. R. Townsend)	

IUGS UNESCO IGCP

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

9 January 1979

Dr. Debra Struhsacker
Earth Science Laboratory
University of Utah
301 Chipeta Way, Suite A
Salt Lake City, Utah 84108

Dear Dr. Struhsacker:

I'm very pleased to learn of your interest. Herewith sample coding forms and instructions. This printing is just about exhausted. A new version, slightly modified as indicated in attached circular 78-7, is to be printed toward the end of this month. Modifications concern only minor matters, and the current form can be used as is, if you want to make copies.

Our official mission is to computerize published information. However, if your unpublished analyses qualify as "grey file" material in the sense of circular 78-7, why not use them to gain experience in carding data as per circular 78-3D?

Again, welcome to project 163!

Sincerely yours,

Felix Chayes

Felix Chayes

FC:mm
Enclosures
cc: Dr. F. Mutschler

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

March 1, 1979

Circular 79-1
IGCP-163-IGBA

Notes on the use of program KRDKON

Introduction

KRDKON is a conversational program designed to assist in moving data from the project data form to a card-image file that follows the card sequencing and labelling conventions proposed in project circular 78-3D and the grammar proposed there down to the field-separator level. It is available to interested IGBA contributors in standard FORTRAN-IV that is essentially character set and machine independent.

KRDKON is designed to do most of the chore-boy work that makes keypunching directly from a complex data form like ours so time consuming. It automatically maintains the specimen- and card-identifier fields described on page 2 of circular 78-3D and also inserts the record symbol on each card image; past supplying the record symbol as the first item of information for each record, the operator need not concern himself with the annoying business of labelling cards. The program also automatically supplies list- and field-separators and issues warnings when system limits on list-lengths are about to be exceeded. It packs card images and correctly positions every item of data in them. In addition, it detects and reports a few of the simpler input errors, usually illegal characters or errors of omission, and requests resubmission as many of these are encountered.

KRDKON does not check spelling, however, nor does it edit grammar specific to the subfields of certain lists; these tasks are to be performed by the system editor, of which a preliminary version (IGBSMK, see circular 78-6B) is now in operation at the central office. The function of KRDKON is to assist in bringing copy to the stage at which it is ready for proofing by the system editor. It certainly does not make card preparation for the project a pleasure, but it should greatly reduce both the pain and the time attendant upon this operation.

KRDKON communicates with the operator by a combination of queries and error messages, the latter appearing when the operator's response to the former is unsatisfactory. The operator initiates communication with the program by depressing the carriage-return key of the terminal.

Having issued a query, the program pauses until the operator responds with a carriage-return. If information of the sort requested in the query remains to be transmitted, the operator types one or more units of it before depressing the carriage-return key. If all of the type of information requested has already been submitted--or none is available in the current specimen description--the operator transmits a blank message, i.e., a carriage return not preceded by other information.

The current edition of KRDKON issues 24 different queries, of which some may be bypassed entirely in a particular work session and others may be repeated many times during a single specimen description. This circular lists the queries in the order in which they occur and describes appropriate responses to each. At several points the discussion presumes some familiarity with circular 78-3D. The terms 'record' and 'specimen description' are used throughout as defined there and in other project documents, viz, a record consists of a preface--containing group title, locality and bibliography-keys--and a variable number of specimen descriptions.

I. Initialization Queries

The first action taken by the program depends on whether it is instructed to extend an existing file or open a new one. Misdirection at this point may be very costly to the user, so these alternatives are treated, somewhat redundantly, as separate questions one of which must be answered affirmatively before data processing starts, viz.--

1A) IS INPUT TO BE ADDED TO AN EXISTING FILE? (Y, N)

A response of 'Y' or 'YES' generates query 2). If the response is 'N', 'NO', or a blank message, query 1B) appears on the console.

1B) DOES FIRST INPUT START A NEW FILE? (Y, N)

A response of 'Y' or 'YES' generates query 2). If the response is 'N', 'NO', or a blank message, query (1A) is regenerated. The loop on 1A-1B continues until the operator responds affirmatively to one or the other.

2) IS FIRST ITEM A SPECIMEN DESCRIPTION? (Y, N)

The first item to be processed in any work session must be either a specimen description or a record preface. A specimen description is valid as an initial item only if an existing file is to be extended.

A reply of 'Y' or 'YES' to 2) triggers query 8) if the response to 1A) was 'Y' or 'YES'; otherwise an error message is printed, and 1A) reappears.

A reply of 'N' or 'NO' to 2) triggers query 3).

II. Queries requesting information recorded on the title and reference sheet of the data form.

3) RECORD SYMBOL, TITLE?

The record symbol (1-3 letters) immediately followed by a comma must always be supplied. The title, a topic phrase of less than 75 characters, is optional. If present, it follows the comma. A response lacking a comma triggers an error message and a request for resubmission.

4) LATITUDE - NEAREST DEGREE NORTH OF ALL SPECIMENS?

The "record latitude" is the degree immediately north of the northernmost specimen locality in the record. An alphabetic qualifier ("N", "North", "S", "South") must precede or follow the numerical information, from which it may be separated by blank space(s) and/or punctuation, as desired.

5) LONGITUDE - NEAREST DEGREE EAST OF ALL SPECIMENS?

The "record longitude" is the degree immediately east of the easternmost specimen locality in the record. The format of the response is as described in 4), above, except that the alphabetic modifier is "E", "W", "East" or "West".

6) CONTRIBUTOR'S NAME?

A 12-character string beginning with the first non-blank character of the response is stored. The contributor's surname should be the first word in the string.

7) SYSTEM REFERENCE NUMBER K?

This is a call for the system number, a 2 to 5 digit integer, of the kth source reference listed on the reference-location sheet of the data form. On receiving such a number the program increments k by one and repeats the query. The iteration continues until $k > 10$ or a blank message is received.

(The current version of KRDKON makes no provision for processing the actual bibliographic citations in the fashion described on page 13 of circular 78-3D. These are easily prepared without benefit of a conversational program. Alternatively, they may be punched directly into cards, or the location-reference sheets may be submitted by mail.)

III. Queries requesting information recorded on the front face of the specimen sheet of the data form.

8) (OPTIONAL) SPECIMEN IDENTIFIER?

The response may be either a 1- or 2-letter symbol or a blank. A symbol is accepted as the specimen identifier; a blank causes the program to increment the current specimen identifier by one letter, i.e., 'A' goes to 'B', 'Z' to 'AA', 'BZ' to 'CA' etc. If a blank message is received for this query on the first specimen in a record, the specimen label 'A' is assigned internally.

9) SPECIMEN LATITUDE X 1000?

Alphabetic and sequencing conventions as in I.4), above. The numerical portion of the response, a 3- to 5-digit integer, is 10^3 times the latitude, the latter being in degrees and decimal parts of a degree.

10) SPECIMEN LONGITUDE X 1000?

Alphabetic and sequencing conventions as in I.5), above. Numerical entry, a 3- to 6-digit integer, is 10^3 times the longitude (in degrees and decimal parts of a degree).

11) ROCK NAME?

A string of k characters, ($0 \leq k \leq 24$), beginning with the first non-blank character in the response, is stored in the assigned part of the appropriate card of a specimen description. If k = 0 the card field will remain blank.

12) GEOLOGICAL UNIT

As in II.11, immediately above, except that the upper limit of k is 36.

13) SEQUENCE NUMBER OF REFERENCE K?

The number k, ($0 < k < 11$), is the order of mention of the analysis reference in the bibliography portion of the reference-location sheet of the data form, i.e., the value of k under which the system number of the reference containing the major-element analysis was entered in II.7, above. A blank response triggers the first appearance of query 14), viz, 'SIO2?'.

14) AAAAA?

AAAAA is the name of one of the variables listed in Block B of the specimen sheet of the coding form. If a blank is returned for any of these, the relevant field on the card image remains blank. A non-blank response for all but the last variable of the block must include a decimal point; the first and second characters to right and left of the decimal point are stored in the appropriate 4-column field of the analysis card. Three columns to the left of the decimal are retained for the author-total.

The last query of this set will be for the variable 'RKNUM', the system index number of the rock name, an integer.

15) STATUS SYMBOL(S)?

Circled symbols in the column at the left edge of the front face of the specimen sheet are entered here, singly, in groups, or all in one response. Multiple entries in a single response must be separated by commas. A blank response terminates the list.

16) TRACE COMPONENT >, = OR < AMOUNT [, REF. NO.]?

Response consists either of a blank message or of data from one or more of the columns in any row(s) of Block C of the specimen sheet, spelled and punctuated as described in circular 78-3D. If the response consists of data for more than one component, a semi-colon separates data for adjacent components. A blank response terminates the list.

17) STRATIGRAPHIC AGE?

Response consists of either a stratigraphic age spelled and punctuated as described in circular 78-3D (except that terminal punctuation may be omitted), or a blank message if the description contains no stratigraphic age.

18) PHYSICAL OR ISOTOPIC AGE(S)?

Response consists of a blank message or of data from one (or more) column(s) of Block D of the specimen sheet, spelled and punctuated as described in circular 78-3D. A semi-colon separates adjacent determinations in the same response. A blank response terminates the list.

19) PETROGRAPHIC DESCRIPTOR(S)?

Response consists of one or more of the symbols circled in Block E of the specimen sheet. These may be entered singly, in groups, or all in a single message. A comma separates adjacent symbols in the same response. A blank response terminates the list.

III. Queries requesting information recorded on the back face of the specimen sheet of the data form.

20) MINERAL DESCRIPTOR(S)?

Response consists of one (or more) of the symbols circled in Block F of the specimen sheet, plus attached modifiers written on the form. Symbols and attached characters may be entered singly, in groups, or all in a single response. A comma separates adjacent symbols in the same response. A blank response terminates the list.

21) ADDITIONAL INFORMATION?

Response is a verbatim copy of information displayed in Block G of the data form. No individual response should exceed the line-length capacity of the console being used for input. Any non-blank response regenerates the query, so that more information may be inserted. A blank response terminates the list.

IV. Cycling instructions

22) MORE DATA NOW? (Y, N)

This query is reached when a specimen description has been completed; it is the only legitimate stopping point in the program. A reply of 'N', 'NO', or a blank message terminates execution under program control. A reply of 'Y' or 'YES' triggers the display of query 23) on the console.

23) IS NEXT INPUT ITEM A RECORD PREFACE? (Y, N)

Query 3) appears on the console if the response to 23) is 'Y' or 'YES', query 8) if it is 'N', 'NO' or a blank message.

V. Deletion of current record(s) or specimen description(s)

Error detection by KRDKON is limited and may not be immediate; erroneous material may be incorporated in the card image file before formal incompatibility between information requested and received leads to issuance of an error message. Errors written to the card image file can not be reached for correction under program control because their exact locations in the file are not known to the program. It is possible, however, to delete entire specimen description(s) or record(s) known or thought to contain errors, (This may sometimes be desirable if the error is substantive rather than merely formal.)

A response of

'DELETE $$ RECORD'

(or simply '$$R') to any query removes the whole of the current record from the file. Similarly, a response of

'DELETE $$ SPECIMEN DESCRIPTION'

(or '$$S') eliminates the current specimen description.

The 'DELETE' response operates only if there is indeed a current item of the type it specifies. There is no current record until query 4) has appeared on the console and no current specimen description until query 9) is reached. When a 'DELETE' message has been serviced, query 22) is issued. The operator must then decide whether to continue the work session, and, if so, whether to resubmit part or all of the material he has just excised, or proceed without it.

VI. Rapid Stop

Unless termination occurs via a response of 'N' to query 22) the file can not be extended, in a subsequent session, by a response of 'Y' to query 1). If it is necessary to end a session when control is at some other query, a response of 'STOP $$' may be used to force control to 22). The 'STOP $$' response deletes the current specimen description; if this penalty is not acceptable the operator must continue the session until 22) is reached in normal fashion.

*   *   *   *

At least one other conversational program for moving information from project data forms to project card image files is known to be in preparation; when ready for release, it will be described in a separate circular.

Inquiries concerning KRDKON should be directed to:

Felix Chayes
Geophysical Laboratory
2801 Upton Street, N. W.
Washington, D. C. 20008

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

8 March 1979

Memorandum for: IGBA contributors and correspondents with definite literature or area/rock type assignments.

Circular 79-2 replaces version JAN 78 of the instruction manual. Please throw the old one away. Included with 79-2 is a sample of the new specimen data sheet, which has been printed on light stock to minimize mailing costs.

Each of you will soon be sent a small supply of data sheets by first class (or air) mail. It seems absurd, considering the continual decline in the quality of the service, that postal charges will be one of our major clerical expenses, perhaps the largest, for some time to come. For larger shipments we may have to abandon 1st class mailing.

If you can arrange for local duplication of the specimen sheet, please do so; the costs are usually nominal. If you have no institutional support for such expenses, reimbursement from the Washington office of the project can be arranged.

If local duplication of specimen forms is inconvenient or impossible, and the supply you receive is inadequate, please don't hesitate to ask for more. (At present, they are stored only in the Washington office.)

We are off to a good start. Let's keep moving! With best wishes to all of you--

Felix Chayes

Felix Chayes

FC:mm

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

April 2, 1979

Circular 79-3
IGCP-163-IGBA

Organizational Status of Project 163-IGBA as of March 1, 1979: An Interim Report to the IGCP Board

Contents

*   *   *   *

I. Introduction

Project 163-IGBA was created to plan and develop a retrospective data base for igneous petrology. To date there has been no summary statement identifying the persons and groups involved in our work. It seemed appropriate to present such a summary to a Board meeting taking place only a few miles from our central office. That is the principal purpose of this report, which concludes with a note about costs.

II. Countries in which national groups have been organized

Country	Convenor
Australia	R. LeMaitre, Melbourne
Bulgaria	R. Ivanov, Sofia
India	A. K. Saha, Calcutta
Italy	R. Cristofolini, Catania
Jugoslavia	V. Majer, Zagreb
Spain	J. Brandle, Madrid
Turkey	C. Unan, Ankara
Union of South Africa	J. Marsh, Grahamstown
United States of America	F. Chayes, Washington, D. C.

The structure of these groups is not uniform, and personnel rosters are available only for the following:

India

A. K. Saha, Calcutta, (Convenor)
M. K. Bose, Calcutta
C. Leelanandan, Osmania
M. N. Quereshy, New Delhi
M. N. Vishwanathayya, Mysore

K. V. Subba Rao, Bombay
S. V. P. Iyengar
S. P. Das Gupta, T. V. Viswanathan, A. V. Krishnamurthy — Geol. Survey of India

Union of South Africa

J. Marsh, Grahamstown (Convenor)
A. Arnold, Durban
J. P. Engelbrecht, Pretoria
D. R. Hunter, Pietermaritzburg
A. Kerr, Durban

A. C. Moore, Capetown
E. P. Saggerson, Durban
A. Schoch, Stellenbosch
M. R. Sharpe, Pretoria
W. J. Verwoerd, Stellenbosch

United States of America: The executive committee consists of:

F. Chayes, Washington, D. C. (Convenor)
F. Mutschler, Cheney, WA
T. L. Wright, Reston, VA

The first named serves as chairman of the U. S. group and the second as its secretary. Membership is open to any U. S. resident who wishes to join in the work of the project and is able to do so. The only 'membership' roster the group maintains is its mailing list, which at present contains 62 names. Of these, about a dozen have administrative interest in our work but are not expected to participate actively in it; the remainder are on the list because they are participating in project work or wish to do so. All U. S. residents named in sections IV and V of this report are members.

Yugoslavia

V. Majer, Zagreb, (Convenor)
S. Grafenauer, Lubljana
V. Đorđević, Belgrade

S. Karamata, Belgrade
J. Pamić, Sarajevo

III. Other countries from which expressions of interest have been received.

(These expressions range from requests for information through reports of ongoing attempts to organize national groups, and include correspondence from nationals cited as contributors in section IV, below.)

Belgium	Cyprus	Guatemala	Netherlands
Brazil	Czechoslovakia	Iceland	New Zealand
Canada	Denmark	Japan	United Kingdom
Colombia	France	Mexico	USSR
			Venezuela

IV. Contributors who have requested specific areal or rock-type assignments.

(Each contributor reports to his own national group if one exists, and directly to the central office otherwise.)

Contributor	Assignment
G. J. J. Aleva, The Hague, Netherlands	Granitic rocks associated with Sn-mineralization in South America and S. E. Asia.
E. Ancochea, Madrid, Spain	Volcanic rocks of the Campos de Calatrava.
A. Aparicio, Madrid, Spain	Granites of Central Spain.
S. Aramaki et al, Tokyo, Japan	Igneous rocks of Japan.
J. Armstrong, Vancouver, Canada	(Some) Cenozoic volcanics of British Columbia and northern U. S.
J. T. Barrera, Madrid, Spain	Basal complex of Fuerteventura, Canary Islands.
S. Barr, Wolfville, Nova Scotia	Igneous rocks of Nova Scotia.
E. Bloomstein, Salt Lake City, Utah, U.S.A.	Igneous rocks of Asiatic Russia.
R. Boutilier, Bridgewater, MA, U.S.A.	Igneous rocks of Massachusetts
J. P. Calzia, Menlo Park, CA, U.S.A.	Eastern Mojave Desert.
R. Cristofolini, Catania, Italy	Mt. Etna and environs.
A. Garcia, Salamanca, Spain	Granites of northwestern Spain.
J. Gill, Santa Cruz, CA, U.S.A.	Fiji, Tonga, Kermadec and adjacent sea floor.
J. D. Godfrey, Edmonton, Canada	Igneous rocks of northern Alberta.
W. Greenwood, Denver, CO, U.S.A.	Idaho batholith.
Ph. Grandclaude, Nancy, France	Granites of France.
P. R. Kyle, Columbus, Ohio, U.S.A.	Igneous rocks of Antarctica,
J. Michot, Brussels, Belgium	Anorthosite and charnockite suites, Mafic rocks of the oceanic crust.
F. Mustchler, Cheney, WA, U.S.A.	U.S. deep sea drilling program
M. Pellicer, Spain	Volcanic rocks of Hierro, Canary Islands.

J. T. Ray, Grand Forks, ND, U.S.A.	Cenozoic volcanics of North Dakota and NE Wyoming.
W. J. Rose, Jr., Houghton, Mich, U.S.A.	Young volcanics of northern central America.
T. Simkin, Washington, D. C., U.S.A.	Galapagos Islands.
S. Steinthorsson, Reykjavik, Iceland	Igneous rocks of Iceland.
D. Struhsacker, Salt Lake City, Utah, U.S.A.	West central Utah, Nevada.
E. Stump, Tempe, AZ, U.S.A.	Pre-Beacon igneous rocks of Antarctica.
D. Velde, Paris, France	Volcanic rocks of France.
T. L. Wright, Reston, VA, U.S.A.	Hawaiian Islands

V. Contributors participating in systematic scans of principal regional source literature.

It was proposed informally by Belgian, Italian and U. S. correspondents that data acquisition keyed directly to the technical literature might be more efficient and would certainly be more easily monitored than scanning based primarily on rock type and/or area.

Systematic scans of major indigenous periodical and occasional literature published since 1917 are now either underway or in the planning stage in Australia, Turkey, the Union of South Africa and the United States. Names of contributors engaged in this work have not been received from the first three of these national groups. Current participants in the U. S. literature scan are:

D. Barker, Austin, TX
K. Bladh, Springfield, Ohio
R. Boutilier, Bridgewater, MA
J. C. Butler, Houston, TX
F. Chayes, Washington, D. C.
J. W. Creasy, Lewiston, ME
J. Dickey, Cambridge, MA
D. W. Fiesinger, Logan, Utah
M. Fukui, Grand Junction, CO
M. Garcia, Honolulu, HA
W. Greenwood, Denver, CO
W. D. Keck, Costa Mesa, CA
M. L. Keith, University Park, PA
S. J. Kozak, Lexington, VA
W. L. Mansker, Albuquerque, NM
D. McIntyre, Claremont, CA
H. O. A. Meyer, Lafayette, IN
B. J. O'Connor, Atlanta, GA
J. T. Ray, Grand Forks, ND
T. L. Robyn, Denver, CO
W. Romey, Canton, NY
D. Rubel, DeKalb, IL
M. F. Sheridan, Tempe, AZ
D. C. Stewart, Burlington, VT
S. Stow, University, AL
D. A. Sundeen, Hattiesburg, MI
S. Usdansky, Minneapolis, MN
D. Wones, Blacksburg, VA

VI. A note on cost estimates.

The individuals and most of the groups mentioned above are concerned primarily with the transfer of information from source references to project data forms. This is a demanding task that will have to be done by accomplished petrologists for most of whom it can never be more than an occasional activity. The reason for involving so many people in it is precisely to insure that individual work loads are not unrealistic. The question of cost does not enter here because, as an IGCP project, we simply could not hope to pay for such work and have no intention of attempting to do so. The success of this crucial step must--and perhaps should--depend on whether the petrological community is willing to contribute its services directly on a volunteer basis.

If this step is even modestly successful, however,--and preliminary indications are that it will be--we must next face the problem of moving information from the accumulated project data forms to punched cards or card image files. Although favorably situated individual contributors will be urged to card their own data, this phase of the operation will be a primary responsibility of the central office and perhaps a few regional offices. And for the bulk of this work we shall certainly have to pay. How much will it cost?

It is embarrassing but probably best to confess that at present we simply do not know. Our information system necessarily contains many optional data lists of variable length. This makes design of a compact, line-per-card data form, a form that would be suitable for use as copy in commercial key punching, extremely difficult. As an alternative, a conversational program has recently been written that generates a system-readable card image file from data supplied, through a keyboard console, in essentially free format. It contains many requests, prompts and error messages, so the user requires only minimal familiarity with the unavoidably complex internal file structure of the project information system. This program, which will greatly facilitate movement of information from data forms to card image files, is about to be put into service. Extensive experience with it at the central office will provide a firm basis for estimating what will surely be one of the major costs of building the new base.

Respectfully submitted,

Felix Chayes

Felix Chayes
Convenor, Project 163.

April 9, 1979

MEMORANDUM

TO: Dennis Nielson, Bob Bamford, Bill Nash, Stan Evans

FROM: Debbie Struhsacker

SUBJECT: IGneous data BAse (IGBA) - Topics for Discussion on Monday, April 9, 1979, 1 P.M., Dept. Geology and Geophysics

I. Data that we wish to contribute
   - published material
   - "grey-zone" luterature
   - anticipated future analyses

II. Coordination with existing ESL and UU/GG geochem and computer programs

III. Designation of areas of responsibility
   - coding of data forms
   - coordination of efforts

IV. Related literature research

Debbie

Debbie Struhsacker

DS/smk

April 10, 1979

MEMORANDUM

TO: J. Hulen, J. Moore, S. Samberg, B. Sibbett, E. Struhsacker

FROM: D. Struhsacker

SUBJECT: Igneous Data Base

We are contributing whole rock and trace element chemical analyses from our work in Utah and Nevada to an international igneous data base organized by Dr. Felix Chayes at the Carnegie Institute. The data that we will submit will consist of both our own analyses, and previously published analyses.

Would you please furnish me with any chemical analyses that you run across during the course of your literature research? I will then see that these data are incorporated into the data base.

Thanks for your help.

Debbie Struhsacker

DS/smk

cc: D. Nielson
J. Stringfellow

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

November 26, 1979

IGCP-163-IGBA
Circular 79-3

Report of the San Diego meeting of the U.S.-IGBA group

The meeting was held in conjunction with the annual convention of the Geological Society of America, Nov. 5-8. The scheduled session occuppied the morning of Nov. 7, and there were numerous informal discussions throughout the convention. The following attended the meeting on Wednesday morning:

Contributors

J. C. Butler, Houston, TX
J. Calzia, Menlo Park, CA
F. Chayes, Washington, D. C.
J. Creasy, Lewiston, ME
D. Fiesinger, Logan, UT
J. Gill, Santa Clara, CA
W. Greenwood, Denver, CO
W. Kleck, Costa Mesa, CA
D. McIntyre, Pomona, CA
F. Mutschler, Cheney, WA
G. L. Sims, Denver, CO
D. Wones, Blacksburg, VA

Observers

J. Brandle, Madrid, Spain
M. Perfit, Canberra, Australia
C. Unan, Ankara, Turkey

Everyone participated actively in the discussion and no votes were required, so the distinction between observers and U.S. attendants was essentially academic. This account is being included in the circular series because much of the discussion will be of interest throughout the project.

The business meeting opened with brief reports from foreign observers and correspondents; these are summarized in our annual report to IGCP, which will also be distributed as a numbered circular.

The chairman then reviewed the current status of data gathering activities of U.S.-IGBA, now of two rather distinct types, (1) assignments dictated by the petrological or areal interests of contributors, and (2) a systematic scan of primary U.S. journal and series publications, in which assignments are of time blocks of one or more publications available in libraries readily accessible to a contributor. A list of assignments of type (1) was issued with last year's report and additional copies are available on request. The major addition to this list during the report year is coverage of the Galapagos Islands, assumed by T. Simkin. Numerous completed coding forms have been received from W. Greenwood, J. Gill, W. Kleck and P. Kyle. E. Bloomstein has discovered that published data for Asiatic Russia are far more abundant than he had supposed, and has prepared IGBA formatted card files of 350 specimen descriptions. He doubts that he can attain anything approaching complete coverage in the life of the project. Rather, he will attempt to devise some systematic sampling of this enormous literature, probably on a geographic or tectonic basis.

The systematic scan of primary U.S. literature was organized in accord with decisions taken at the Syracuse meeting in October of 1978. During the report year the following, listed by publication-assignment, were involved in this work:

American Journal of Science: D. Barker*, J. Dickey, D. W. Feisinger*, H. O. A. Meyer, S. Usdansky.

American Mineralogist: K. Bladh*, J. C. Butler*, J. T. Ray, D. Wones.

Bull. Geol. Soc. America: R. Boutilier*, J. R. Butler, B. J. O'Connor, M. Garcia, D. C. Stewart.

Bulletins of the U.S.G.S.: W. Greenwood*, W. L. Mansker, M. F. Sheridan.

Economic Geology: M. Fukui, W. E. Kleck.

Journal of Geology: R. Boutilier, S. J. Kozak, W. Romey*, S. Stow.

Geol. Soc. Amer. Memoirs: W. L. Mansker, D. Rubel*, D. A. Sundeen*.

U.S.G.S. Prof. Papers: J. W. Creasy*, D. McIntyre.

Journal of Geophysical Research: W. Bryan.

As of this writing, 231 completed coding forms have been submitted by rock-type contributors and another 450 descriptions, in coding forms or card files, are promised in the near future. The literature-scanners have submitted 851 completed forms and another 200 are about to enter the pipeline.

Of the 1082 completed coding forms so far submitted by the U.S. group, only 20% have been processed into machine readable form. Excessive delay in processing coding forms is bound to result in loss of impetus and interest. Transfer of data from forms to card image files by the central office will be stressed in the immediate future.

With anticipated acceleration of the rate of receipt of coding forms, however, it is not likely that the presently constituted central office can reach or maintain currency. There was considerable discussion of decentralization of the data transfer operation; several participants requested listings of the conversational program in use at the central office, and probably some of these will soon be submitting card image files rather than coding forms. It was also suggested that the USGS be requested to process coding forms prepared by contributors who are Survey members.

For the near and mid-future, however, the bulk of this operation will continue to be a responsibility of the central office, and the chairman was urged to seek more stable financing of its activities. It was suggested that

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*Completed coding forms have been submitted by those whose names are marked by asterisks.

he discuss this matter with IGCP and perhaps directly with IUGS, and that representations be made to the U.S. National Committee on Geology. (These avenues are now being explored.)

In a discussion of the coding form, chaired by J. C. Butler, concern was expressed about lack of sorting capability with regard to information often stored in Block G ('Additional Information') of the coding form. It was suggested that mnemonic keys be developed for tagging specific gravity, modal analysis, isotope measurements, and contributor's editorial comment. (Such tags and appropriate instructions for using them are now being developed; further suggestions are solicited). It was recommended that in future printings of the coding form:

(1) the duplicate entry 'EF FELSITIC' be removed from the texture-structure section of Block E, and

(2) the heading 'TOTAL' in block B be changed to 'AUTOT', to make it clear that the information to be entered is the total given by the author in the source description, not a total computed by the contributor.

There was apprehension about the possibility of duplication of effort, both within the rock-type assignment team and as between it and the systematic literature scanners. Circulation of a complete list of assignments of members of U.S.-IGBA was requested. (The list is now in preparation). The risk of duplication will be minimal if contributors communicate freely with each other; unless one or other of the interested parties has actually submitted completed forms or card image files, however, the central office will usually have no useful information on the status of work in progress.

F. Mutschler chaired a discussion of the vexing problems occasioned by the lack of "specificity" in rock description. There seemed general agreement that modern descriptions are far more likely to err in this respect than middle aged or old ones. W. Greenwood and F. Mutschler were asked to prepare a note reviewing common flaws in petrographic description that lead to incomplete exploitation of possibilities for storage, selection and reduction implicit in the project coding form.

(The meeting was run with no officially designated recorder, and rather than risk errors of attribution I have made no attempt to identify authors of specific comments or suggestions. General approval and support of most of these was evident in the discussion. I do not recall a large committee meeting in which participation was either so general or so useful. The numbered-circular series and mailing facilities of the project are available to any participant who wishes either to correct errors of omission or commission in this account, or to extend discussion of any of the items reviewed in it.)

Felix Chayes

Felix Chayes, Chairman
IGCP-163-IGBA

IUGS UNESCO IGCP

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

November 27, 1979

IGCP-163-IGBA
Circular 79-4

Annual Report of IGCP Project 163 to the Secretary of IUGS

The project is commissioned to stimulate and assist in the development of a retrospective world data base for igneous petrology. We feel this will be done most effectively by an initial emphasis on example rather than precept. Accordingly, we have created a glossary of symbolic and numeric abbreviations of petrographic terms, stratigraphic age terms, and mineral and rock names for use in rock description, a coding form to be used as hard copy, standardized grammar and syntax for use in moving data from hard copy to machine readable form, conversational programs to facilitate that movement, and a provisional information system that is capable of receiving, storing, updating and retrieving such data. We have also organized a number of groups that have undertaken or will undertake systematic scans of large blocks of the petrographic literature, and a central office that tries to coordinate the efforts of these groups. Each of these activities is described or reviewed in earlier numbered project circulars of which the more important were described in last year's report. Here only developments postdating that report are treated.

I. Activities of National Groups and Unaffiliated Contributors

During the report year national groups were formally established in Australia and the United Kingdom, and those in India, Spain, Turkey and the United States were particularly active.

M. Perfit reports that the newly organized Australian group plans to concentrate first on the recent volcanics of Papua and New Guinea. The group may submit card-image files rather than coding forms.

A. K. Saha writes that the encoding of rock descriptions from the Indian literature is well advanced and should be completed in January of 1980. Whether the Indian group plans to submit coding forms directly or will itself undertake to move information from them to machine readable form has not been announced.

R. Cristofolini has submitted the first major contribution of the Italian group, coding forms covering the subalkaline lavas of Etna. For the present the Italian group will rely on the central office for further processing of its data.

The Spanish group, largely through the efforts of its organizer, J. Brandle, has also made signal progress. They have submitted card image files of approximately 2000 specimen descriptions in a format predating that developed by the project; as of this writing Brandle is in residence at the central office working with Chayes on a final processing of the data, required by differences between card formats of the Spanish group and the central office. He reports, however, that Spanish petrologists seem relatively uninterested in constructing a retrospective base and prefer dealing with new data along the lines of project CEPIC.

The Turkish group has more nearly discharged its major assignment than any other. C. Unan reports that it has completed its extraction of information from publications appearing prior to July of 1979. It has also constructed its own information system and has generated card-image files for submission to the central office. During a working visit to the central office Unan collaborated with Chayes in construction of a translator that uses the Turkish file as input and generates a new file in IGBA card format; 434 Turkish specimen descriptions processed in this fashion have been stored in the central office repository.

Contributions have been received from 3 members of the South African group, of which J. Marsh is the organizer.

The U. S. group has formed two teams of contributors. One group allocates its assignments according to the rock type or areal interests of the individual contributor. The other, set up this year after extended discussion at the Syracuse meeting of the project, is engaged in a systematic scan of major U. S. periodicals and serials, and assigns each contributor a time block of some one of these publications. As of this writing nearly 1100 specimen descriptions have been submitted to the central office by these teams, and another 800 are expected before the end of the year.

There is probably activity in other national groups, but as of this writing they have provided no information beyond that given in last year's report. Individuals residing in countries lacking national groups continue to be welcome as contributors. During the report year R. Brousse and A. Havette of Orsay, France, accepted responsibility for coverage of the Marqueses Islands and J. O. Santos of Recife, Brazil, submitted coded descriptions of the ultramafics of the upper Amazon Valley.

II. Activities of the Central Office

As of mid-November the central office had received 1352 completed coding forms, of which about 300 have been translated into machine readable form and stored in card image disc files. The 434 Turkish specimen descriptions are also stored in this form and it is hoped this will soon be true of the Spanish data referred to above.

Translation of card image files from the format in which they are received to that used in the central repository is not a severe problem. Further, it is to be hoped that as communication between regional offices and the central office develops, the need for such translation will vanish. (It is the long range policy of the project that data will be transmitted--in either direction--in card image files following a standard project format already adopted.)

Movement of data from coding form to machine readable form, however, is another matter. It was understood from the outset that this would be a demanding operation, as it is in the construction of every base in which the initial data record is non-electronic. Only with this year's working experience, however, have we begun to accumulate the kind of information needed to delineate and evaluate the problem.

Each coding form contains one specimen description, but the amount of information on a form varies greatly among specimens. The figures given here are therefore averages; to date, further, they are averages based on rather small samples, for of the 1352 coding forms received, less than a quarter have been processed into machine readable form.

The processing of a specimen form is currently requiring about 5 minutes of editing by a petrologist fully familiar with the structure and organization of the information system and another 4 minutes of high grade subprofessional labor by someone, preferably an advanced student, who knows a little petrography, is familiar with the coding form, and is able to operate conversationally on a typewriter-like data terminal.

With increased experience editing time may be halved; with planned improvement of the conversational program for data entry the time required for actual transfer may also be halved. At present, however, it does not seem realistic to expect that increased experience and improved programming will reduce the time-per-specimen-description much below 4 minutes, and probably we should not expect an average of less than 6 minutes per transfer in the immediate future. To process the 1800 forms expected to be in backlog by the beginning of the year will thus require some 180 hours of labor time about evenly divided between editing and data transfer and it is expected that the rate of receipt of coding forms will increase markedly during 1980. It appears that it will be possible to distribute some of this labor among contributors, (see attached copy of U.S.-IGBA report), and if the amount assigned any one contributor can be kept small there probably will be no charge for the editorial aspects of the operation. But a reasonable labor charge for the data transfer itself is virtually unavoidable, wherever the work is actually performed.

If one considers the available supply of published information awaiting processing--probably something between 100,000 and 200,000 specimen descriptions--it is clear that completion of the data base is not possible within the current IGCP framework, and this in fact has never been envisaged. We are using IGCP to stimulate and assist in the development of the base, however, and feel the most effective way to do this is to construct a pilot system drawing information from a base which, though small relative to the published *corpus* of the subject, is large enough to be of substantive interest to the profession.

That is what we are attempting, and moving data from coding form to machine readable form in reasonable time is a vital and crucial part of the attempt. Present indications are that there will be strong professional interest in a usable base and that we shall have no difficulty obtaining volunteer labor of a very high order for the initial data gathering step, providing we are able to move the data from hard copy to machine readable form propitiously and accurately. An inept performance of this intermediate step, however, will sacrifice the interest both of those prepared to assist in the building of the base and of potential ultimate users of it. We must reach a practical solution of this problem.

III. Meetings, past and future

There was no formal international meeting of the project in 1979, but there were national group meetings in Turkey, Spain, Jugoslavia, India, Australia and the U. S. Plans for the project chairman to attend a meeting of the Indian group and for an Indian delegate to attend the meeting of the U. S. group were unsuccessful. Organizers of the Spanish and Turkish groups and a delegate from the Australian group, however, did attend and report to the meeting of the U. S. group, an account of which is appended. Extended working visits to the central office were made by the Turkish and Spanish organizers, with support from the U. S. National Science Foundation.

*   *   *

Although unable to attend the San Diego meeting, the organizer of the Australian national group, R. LeMaitre, paid a brief visit to the central office late in October. His visit coincided with that of C. Unan, the chairman of the Turkish group, and provided an opportunity for broad review of the problems and prospects of the project. Much of the discussion paralleled that reported above and in the attached account of the U. S.-IGBA meeting. In particular, it was agreed that an updated list of contributors and, as far as known to the central office, their specific assignments should be circulated in the near future. Another matter discussed at length in this conference, but not considered elsewhere, is the desirability of arranging coverage of certain major journals that are rich in petrographic data but have so far escaped our net.

Some of these are essentially international in scope and circulation, so that it might be reasonable to argue that their coverage is not the implicit responsibility of any national group. Others are dominantly national, but are published in countries in which national groups either have not yet been organized or are not yet active. In either case, the central office will act as clearing house for coverage assignments pending action by appropriate national groups. Petrologists at home in the languages concerned and willing to accept assignment of 5 or 10 year blocks of any of the following:

Bulletin de Mineralogie
Bulletin Volcanologique
Geological Magazine
Geol. Rundschau
Jour. of the Geological Society
Journal of Petrology
Mineralogical Magazine
Neues Jahrb. Min. u. Pet.

Periodico di Mineralogia
Schweizerische Min. u. Pet. Mitt.
Tschermak's Min. u. Pet. Mitt.

are requested to communicate with the undersigned.

* * *

European members have urged a meeting somewhere in Europe during 1980, and it would be natural to schedule this in conjunction with IUGS in Paris. Unfortunately, we have reserved no space for such a meeting, so it could not be an official part of the Congress. Further, several correspondents point out that the Congress schedule is very full and members attending would probably not wish to spend long hours in work sessions about project affairs. At this writing we strongly favor a European meeting during 1980 and are about evenly divided about whether it should be run in Paris in parallel with the IUGS Congress.

IV. Budget for 1980

A budget request for 1980 will be submitted when plans for the next meeting of the project are further advanced.

Respectfully submitted,

Felix Chayes, Chairman
IGCP-163-IGBA

IUGS UNESCO IGCP

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

Circular 81-2
IGCP-163-IGBA
15 May 1981

Current Status of Project 163-IGBA; an interim report for the May meeting of the US-IGCP Committee

I. - The US Group. The systematic scan of major US literature continues. The run of each of 9 publications has been divided into 5 time blocks for individual assignment, all blocks have been assigned, and complete scans of 18 have been received and transferred from coding forms to machine readable card image files. This transfer work has overtaxed the central office, to the detriment of work on the design of the base, on the development of retrieval and reduction software, and on negotiating the final placement and management of an operable - preferrably an operating! - system. As described in our 1980 report to IGCP, however, the bulk of the data transfer work has now been reduced to an operation that can be carried through successfully by properly trained student labor. Currently, the whole data transfer operation is at last being decentralized. Several interested contributors have expressed willingness to accept responsibility along these lines, one has already submitted trial card image files on disc, a second is actively preparing to do so by tape, and a third will probably undertake similar work in the near future.

The US group is to be the host of the 1981 meeting of the project, provisionally scheduled to be held in Hawaii next December.

II. - General project activities probably of interest to the US-IGCP committee. The following items describe responses to discussions held and decisions taken at the Madrid meeting of the project.

(1) Storage of derived variables. It was suggested at Madrid that certain derived variables - norms and other widely used petrographic statistics calculated from an analysis - should be stored with each specimen description. Discussion of this proposal led to the work decribed in circular 80-8, from which it appears that storage of derived variables would be grossly impractical. Copies of circular 80-8 are available to interested readers of this report.

(2) Recording trace element amounts and radiochemical ages. - At Madrid it was decided that the ad hoc literal factors so far used for scaling these quantities should be replaced by some systematic variant of 'mathematical' or exponential notation. Considerable experimentation led to the scheme described in circular 81-1. It satisfies criteria proposed at Madrid, is easy to use, and is now standard at the central office.

(3) Tagging and framing of optional information in the uncoded "additional information" block of the coding form. - Because of rather extended discussion of item (4), below, this matter was not adequately explored at Madrid. For reasons described under (4), proposed minor modifications of the current scheme, presented as an agenda item at Madrid, have been adopted. The scheme implies a search procedure in which a character scan of the block proceeds until a left frame is found, and the label or tag, the first two non-blank characters to the right of the left frame, is located and interpreted, identifying information between itself and the next right frame; action taken by the scanning program will then depend on whether or not the tag found is one specified in the current scanning schedule. A list of labels now in use in the central office is being prepared for distribution.

(4) - System structure and input format. - The grammar, syntax and vocabulary described in circulars 78-3d and 79-2, and utilized by the central ofice, were criticized by three of the Madrid conferees, but there was insufficient time for resolution of differences, or even for their proper articulation. The criticism seemed to be to the effect that the coding form was confusing and that both its numerous optional lists to be read in character format and the separators used to delimit them would make it impossible to use currently available data management systems in scanning a card-image version of the base. Two groups volunteered to prepare alternative coding forms, structure, and language that would be more compatible with existing processing facilities available in the earth sciences. Neither has yet reported. At our present stage of development a fundamental change of system format would present no particular difficulty provided available data files followed exactly some specific structure; a single translator could then bring the base from its current format to any clearly specified alternative.

Although no alternative has yet been presented for consideration, it seemed sensible to completely standardize current holdings. Accordingly, all files containing data initially transferred from coding forms at the central office have been edited to bring them into conformity with items (2) and (3) above. This includes all data submitted by US, Brazilian, Italian, Israeli and South African contributors; if Spanish and Turkish material submitted in card image form can not be updated by original contributors it will be edited, as time permits, at the central office. All coding forms received since September of 1980 have been processed in accord with these conventions, which will be maintained in force pending resolution of the present controversy about system structure and input format. A revised account of the system vocabulary and grammar, repairing errors and omissions contributors have detected in the current version, will be undertaken in the near future. It will incorporate changes noted above with regard to the framing and tagging of various kinds of "additional information" and the scaling of trace element amounts and radiochemical ages.

Felix Chayes, Chairman
IGCP - 163 - IGBA

(Submitted to US-IGCP Committee 6 May 1981)

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAM

Circular 81-3
IGCP-163-IGBA
15 May 1981

1981 MEETING - FIRST NOTICE

The 1981 meeting of the project will be held in Hawaii, on 19-22 December. Technical sessions will be in the auditorium of the National Park Service Building. Housing will be in the Volcano House, with some less expensive lodging available in nearby dormitory style accommodations. A two-day post-meeting field excursion is under consideration.

A provisional agenda will be distributed late in June. Most of the meeting time will probably have to be devoted to matters immediately concerned with base design and construction, as usual. For the first time, however, we plan to set aside at least one session for reports of scientific work stimulated or facilitated by project activities. If you have such a communication to offer or wish to suggest an agenda item for one of the business sessions, or both, please let us know promptly.

In order to hold space, and for general planning purposes, we need some idea of how many of you will - or may, or might - attend. What is needed right now is not a firm committment but an expression of interest, with perhaps a succinct characterization of how serious your interest is. No questionnaire this time; everyone who wants to be counted will have to write a card or note to -

Felix Chayes, Chairman
IGCP-163-IGBA
Geophysical Laboratory
2801 Upton Street, NW
Washington, DC 20008, USA

PS: re support. Partial support will be available for some attendees. Preference will be given those who may be expected to contribute actively to the proceedings, with appropriate bias in favor of residents of the circum- and intra-Pacific areas.

FC
IGBA

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EXPLANATORY NOTES FOR VERSION 5FEB79 OF DATA FORMS FOR IGNEOUS DATA BASE DESIGNED BY IGCP PROJECT 163, 'IGBA'

(IGBA CIRCULAR 79-2)

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PREPARED BY FELIX CHAYES AND FELIX MUTSCHLER
WITH EDITORIAL ASSISTANCE BY LARRY FINGER

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THE 'GROUP TITLE-AND-REFERENCE' SHEET

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CONTRIBUTOR'S NAME: YOUR NAME, SURNAME FIRST, E.G., 'JONES, J.'

CONTRIBUTION NUMBER: ASSIGN YOUR OWN, E.G., 'JONES 1', AND ENTER IT HERE AND ON EACH ASSOCIATED SPECIMEN SHEET.

GROUP TITLE: ASSIGN A TOPICAL DESIGNATION CONSISTING MOSTLY OF ROCK AND PLACE NAMES, E.G., 'BASALTS OF HEKLA VOLCANO, ICELAND' (TITLE MUST NOT EXCEED 72 CHARACTERS)

GROUP LOCATION: THE LATITUDE AND LONGITUDE OF THE NORTHEASTERNMOST SAMPLE SITE RECORDED ON ANY SPECIMEN SHEET IN THE GROUP (ROUNDED TO THE NEAREST DEGREE). A GROUP MAY CONTAIN DESCRIPTIONS OF UP TO 100 SPECIMENS DISTANT FROM EACH OTHER BY NO MORE THAN 5 DEGREES OF EITHER LATITUDE OR LONGITUDE. LATITUDE SHOULD BE FOLLOWED BY 'N' OR 'S' FOR NORTH OR SOUTH. LONGITUDE SHOULD BE FOLLOWED BY 'E' OR 'W' FOR EAST OR WEST.

SOURCE REFERENCE(S): LIST REFERENCES USING COMPLETE BIBLIOGRAPHIC CITATIONS IN THE CURRENT FORMAT OF THE BULLETIN OF THE GEOLOGICAL SOCIETY OF AMERICA, EXCEPT THAT ABBREVIATION OF THE NAMES OF PUBLICATIONS IS PERMITTED. ASSIGN A 'WITHIN-GROUP' NUMBER, IN THE RANGE 1 - 10 TO EACH REFERENCE. ON THE SPECIMEN SHEET ALL REFERENCES ARE KEYED BY THESE NUMBERS.

****

THE SPECIMEN SHEET

****

CONTRIBUTOR'S NAME: YOUR NAME, SURNAME FIRST

CONTRIBUTION NO.: ENTER FROM REFERENCE SHEET

****

A. HEADING INFORMATION

ROCK NAME: IF NAME USED IN SOURCE IS NOT INCLUDED IN TABLE 1 OF THESE NOTES, WRITE IT OUT HERE.

GEOLOGICAL UNIT: THIS SHOULD INCLUDE GEOLOGIC FORMATION NAMES, INFORMAL IGNEOUS UNIT NAMES, NAMES OF VOLCANOES, E.G.

'COLUMBIA RIVER GROUP'
'HEKLA VOLCANO'
'ASO CALDERA'
'YELLOWSTONE GROUP-PLATEAU RHYOLITE'
'EAST RIFT OF KILAUEA'
'SIERRA NEVADA BATHOLITH'

UNIT NAMES MAY NOT EXCEED 36 CHARACTERS.

LOCATION: RECORD LATITUDE AND LONGITUDE (FROM GREENWICH MERIDIAN) IN DEGREES AND DECIMAL PARTS OF DEGREES, TO 0.01 DEGREE IF POSSIBLE. IF THE SOURCE REFERENCE DOES NOT GIVE A LATITUDE-LONGITUDE SPECIMEN LOCATION, THE CONTRIBUTOR SHOULD TRY TO ESTABLISH ONE. THE TIMES (LONDON) ATLAS OF THE WORLD--MID CENTURY EDITION--MAY BE USED AS A MINIMUM STANDARD. LATITUDE SHOULD BE FOLLOWED BY 'N' OR 'S' FOR NORTH OR SOUTH. LONGITUDE SHOULD BE FOLLOWED BY 'E' OR 'W' FOR EAST OR WEST.

REFERENCE NO.: 'WITHIN-GROUP' NUMBER OF REFERENCE CONTAINING ESSENTIAL OXIDE ANALYSIS

****

B. ESSENTIAL OXIDES

ENTER WEIGHT PERCENT OXIDES IN BOXES PROVIDED. IF NO VALUE FOR AN OXIDE IS RECORDED IN THE SOURCE REFERENCE, LEAVE ITS BOX BLANK. ENTER 'TRACE', 'TR', 'ND', ETC. ONLY IF USED IN THE SOURCE.

UNDER 'RKNUM' ENTER A NUMBER FROM TABLE 1. IF NO NAME IS USED IN SOURCE, SET 'RKNUM' = 10. IF THE NOUN OF THE SOURCE DOES NOT APPEAR IN TABLE 1, SET 'RKNUM' = 20.

****

C. TRACE ELEMENTS AND COMPONENTS

USE AS MANY COLUMNS AS NECESSARY.

'NAME' IS THE CHEMICAL SYMBOL FOR AN ELEMENT OR COMPOUND.

'AMOUNT' IS A WEIGHT, WITH SUFFIX 'H' OR 'P' IF IT IS PARTS PER 10,000, 'B' IF PARTS PER BILLION, 'M' IF PARTS PER MILLION.

A RANGE OR INEQUALITY MAY BE ENTERED HERE IF USED IN THE SOURCE.

'REFERENCE' NEED BE RECORDED HERE ONLY IF IT IS NOT THE SAME AS IN BLOCK 'A' ABOVE.

****

D. AGE

STRATIGRAPHIC:

FROM THE FOLLOWING LIST OF AGE TERMS ENTER THE CODE(S) FOR THE MOST SPECIFIC TERM(S) APPLIED TO THE ANALYZED SPECIMEN IN THE SOURCE DESCRIPTION, OR INFERRED THERE FROM LOCAL EVIDENCE. (IN THE LATTER CASE, ALSO CIRCLE STATUS SYMBOL '4C' -- SEE INSTRUCTIONS FOR BLOCK 'H').

NOTE: ALL BUT 6 OF THE CODES ARE JUST THE 1ST 4 LETTERS OF THE TERMS DENOTED. EXCEPTIONS ARE 'PALG', 'PALC', 'PALZ', 'PRCX', 'PRCY', 'PRCZ'

AGE NOUNS -	CODE
CENOZOIC	CENO
QUATERNARY	QUAT
HISTORIC, OR CALENDAR	HIST
PLEISTOCENE	PLEI
TERTIARY	TERT
NEOGENE	NEOG
PLIOCENE	PLIO
MIOCENE	MIOC
PALEOGENE	PALG
OLIGOCENE	OLIG
EOCENE	EOCE
PALEOCENE	PALC
MESOZOIC	MESO
CRETACEOUS	CRET
JURASSIC	JURA
TRIASSIC	TRIA
PALEOZOIC	PALZ
PERMIAN	PERM
CARBONIFEROUS	CARB
DEVONIAN	DEVO
SILURIAN	SILU
ORDOVICIAN	ORDO
CAMBRIAN	CAMB
PRECAMBRIAN	PREC
PRECAMBRIAN Z	PRCZ
PRECAMBRIAN Y	PRCY
PRECAMBRIAN X	PRCX
OTHER (ADD IN BLOCK G)	OTHE

AN AGE NOUN MAY BE PREFIXED BY ONE OF THE FOLLOWING ADJECTIVES. USE A HYPHEN (-) TO SEPARATE ADJECTIVE FROM NOUN.

AGE ADJECTIVES -	CODE
POST-	POST-
UPPER-	UPPE-
LATE-	LATE-
MIDDLE-	MIDD-
LOWER-	LOWE-
EARLY-	EARL-
PRE-	PRE-

AGE RANGES MAY BE ENTERED IF CLEARLY STATED IN THE SOURCE REFERENCE. THE UPPER AND LOWER LIMITS OF A RANGE ARE

SEPARATED BY A SLASH, FOR EXAMPLE - 'MESO/UPPE-PALZ'.

IF AN AGE DESIGNATION IN THE SOURCE REFERENCE DOES NOT MATCH ANY ONE OR COMBINATION OF THE ABOVE NOUN AND ADJECTIVE CODES, WRITE 'OTHER' IN THE SPACE FOR 'STRATIGRAPHIC AGE' AND EXPLAIN IN BLOCK 'G'. ALSO CIRCLE STATUS SYMBOL '4C' (SEE BLOCK 'H').

CALENDAR OR HISTORIC AGES ARE CONSIDERED PART OF THE STRATIGRAPHIC AGE LIST. THE FULL FORM IS 'HIST/KKKKAA' WHERE 'KKKK' IS EITHER THE YEAR OF THE FORMATION OF THE ROCK OR ITS AGE IN YEARS, 'AA' IS THE ERA DESIGNATION ('BC','AD' OR 'BP'). 'HIST' MAY STAND ALONE IF THE SOURCE GIVES NO VALUE FOR 'KKKK'. IF 'KKKK' IS A DATE, IT MUST BE FOLLOWED BY THE APPROPRIATE SUFFIX, 'AD' OR 'BC'. IF 'KKKK' IS AN AGE, THE SUFFIX 'BP' IS USED.

ISOTOPIC OR PHYSICAL AGE(S):

IF AN ISOTOPIC OR PHYSICAL AGE DETERMINATION IS AVAILABLE FOR THE ANALYZED SPECIMEN IN SOME REFERENCE, OR IS INFERRED THERE FOR IT FROM LOCAL EVIDENCE, ENTER THE APPROPRIATE INFORMATION IN ONE OR MORE OF THE COLUMNS HERE.

YEARS -- AN INTEGER SUFFIXED BY A LITERAL SCALE SYMBOL FROM THE FOLLOWING LIST:

AGE UNIT	SYMBOL
YEARS	Y
HUNDREDS OF YEARS	H
TENS OF THOUSANDS OF YEARS	T
MILLIONS OF YEARS	M

METHOD -- A MNEMONIC DENOTING METHOD, FROM THE FOLLOWING LIST:

METHOD	SYMBOL
CARBON 14	C14
FISSION TRACK	FSTR
ISOCHRON	ISKR
POTASSIUM-ARGON	KAR
MAGNETIC STRIPING	MGNT
NEODYMIUM-SAMARIUM	NDSM
RUBIDIUM-STRONTIUM	RBSR
LEAD-URANIUM	UPB

MATERIAL -- IN THIS SPACE ENTER A CODE FOR THE MATERIAL ON WHICH THE AGE WAS DETERMINED. IT

MAY BE THE SYMBOL FOR A MINERAL NAME FROM BLOCK 'F' OF THE CODING FORM , OR 'WR' DENOTING WHOLE ROCK.

REF. NO. -- ENTER REFERENCE NUMBER HERE. (IT WILL USUALLY, BUT NOT NECESSARILY, BE THE SAME AS THAT ENTERED IN BLOCK 'A'.

IF THE AGE DETERMINATION WAS NOT MADE ON THE ANALYZED SPECIMEN PLEASE CIRCLE STATUS SYMBOL '4D' (SEE BLOCK 'H').

****

E. PETROGRAPHIC DESCRIPTORS

THESE ARE DIVIDED INTO FOUR CATEGORIES AND LISTED ALPHABETICALLY WITHIN EACH CATEGORY. CIRCLE THE PAIR OF LETTERS TO THE LEFT OF ANY TERM APPLIED, IN THE SOURCE REFERENCE, TO THE ANALYZED SPECIMEN. IN CASE OF REDUNDANCE -- E.G. 'GLASSY', 'HOLOHYALINE', 'HYALINE', 'VITREOUS', VITROPHYRIC' -- CHOOSE THE TERM CLOSEST TO THAT USED IN THE SOURCE DESCRIPTION.

IF YOU CANNOT BE SURE THE AUTHOR OF THE DESCRIPTION MEANS TO APPLY A DESCRIPTOR IN BLOCK 'E' TO THE ANALYZED SPECIMEN ITSELF, CIRCLE STATUS SYMBOL '4A' IN BLOCK 'H' AS WELL AS THE DESCRIPTOR SYMBOLS IN BLOCK 'E'.

WHEN DESCRIPTORS ARE OBTAINED FROM ANY SOURCE REFERENCE OTHER THAN THAT LISTED IN BLOCK 'A', ENTER THE REFERENCE NUMBER TO THE LEFT OF EACH APPLICABLE SYMBOL YOU HAVE CIRCLED IN BLOCK 'E'.

F. MINERAL ASSEMBLAGE

HERE, AS EVERYWHERE ON THE FORM, CHOOSE THE MOST SPECIFIC TERMS JUSTIFIED BY THE SOURCE DESCRIPTION. IF A MINERAL IS MENTIONED IN THE SOURCE, CIRCLE THE LITERAL SYMBOL TO THE LEFT OF THE MINERAL NAME ON THE FORM.

ENTER, BETWEEN THE SYMBOL AND MINERAL NAME, ANY ONE OR COMBINATION OF THE FOLLOWING INDEX SYMBOLS, AS APPROPRIATE, IN ANY ORDER -

A ACCESSORY
1 ALLOTRIOMORPHIC
1 ANHEDRAL
3 AUTOMORPHIC
2 CUMULUS
3 EUHEDRAL
4 GROUNDMASS
6 HYPIDIOMORPHIC
3 IDIOMORPHIC
5 INTRACUMULUS
C MICROLITIC
7 PHENOCRYST
8 REPLACED
9 SECONDARY
6 SUBHEDRAL
B XENOCRYST
1 XENOMORPHIC
D NEW CHEMICAL ANALYSIS IN SOURCE REFERENCE
E NEW X-RAY STRUCTURAL DATA IN SOURCE REFERENCE
F NEW OPTICAL OR OTHER PHYSICAL DATA IN SOURCE REF.

IF THERE IS DOUBT ABOUT A MINERAL IDENTIFICATION, PLEASE CIRCLE THE 'OTHER' SYMBOL FOR THE GROUP AND EXPLAIN IN BLOCK 'G'. IF IT IS NOT CLEAR THAT THE MINERAL ACTUALLY OCCURS IN THE ANALYSED SPECIMEN, ALSO CIRCLE THE STATUS SYMBOL '4B' -SEE 'H' BELOW.

IF MINERAL ASSEMBLAGE DATA ARE TAKEN FROM A REFERENCE OTHER THAN THE SOURCE CITED IN BLOCK 'A' (THE REFERENCE FROM WHICH THE ESSENTIAL OXIDE ANALYSIS WAS DRAWN), ENTER ITS NUMBER TO THE LEFT OF EACH LITERAL MINERAL SYMBOL TO WHICH IT APPLIES.

G. ADDITIONAL NOTES:

YOU MAY ADD HERE ANY SOURCE INFORMATION ABOUT AN ANALYZED SPECIMEN FOR WHICH THE CURRENT CODING MAKES NO PROVISION, E.G. -- QUANTITATIVE MODES, DENSITY, GRAIN SIZE MEASUREMENTS, ETC.

IF ANY OF THE 'OTHER' CODES IN BLOCKS 'D', 'E', OR 'F' HAVE BEEN USED, PLEASE EXPLAIN HERE. PRECEDE EACH EXPLANATION WITH THE APPROPRIATE 'OTHER' CODE, E.G., 'T9 -- ZUNYITE'.

SIMILARLY, IF YOU HAVE CODED ANY OF THE MINERAL GROUPS FOR WHICH NO SPECIES NAMES ARE PROVIDED IN BLOCK 'F', I.E. 'CLAY MINERAL(S)' OR 'SULFATE MINERAL(S)', AND THE SOURCE REFERENCE GIVES MORE EXPLICIT INFORMATION, YOU MAY INSERT IT HERE, E.G. 'TF -- KAOLINITE', 'VI -- ALUNITE', OR 'V9 -- GALENA'.

SITE NUMBER AND/OR DEPTH SPECIFICATIONS, IF AVAILABLE, MAY BE ENTERED HERE FOR DRILL HOLE SAMPLES. INFORMATION ON CORE AND DREDGE SAMPLES SHOULD FOLLOW THE FORMAT OUTLINED IN IGCP-163-IGBA CIRCULAR 78-5.

AUTHOR'S SPECIMEN NO. ('S'), OR THE PAGE NO. ('P') OR TABLE NO. ('T') IN WHICH THE ANALYSIS IS GIVEN IN THE SOURCE REFERENCE MAY BE ENTERED HERE (E.G., 'S.1520', 'P.372', OR 'T.9').

('LINK-WORDS' CROSS REFERENCING OTHER FILES IN WHICH FURTHER INFORMATION ABOUT THE SPECIMEN MAY BE FOUND ARE ALSO TO BE ENTERED IN THIS BLOCK. AT PRESENT NO CODING IS AVAILABLE FOR SUCH WORDS. THE STRUCTURE OF EACH LINK MUST BE WORKED OUT WITH THE MANAGER(S) OF THE FILE IN QUESTION. FILES CURRENTLY UNDER CONSIDERATION FOR LINKAGE WITH IGBA INCLUDE THE TECTONIC PETROLOGY AND ACTIVE VOLCANO FILES OF IAVCEI AND THE RADIOMETRIC AGE FILE OF THE USGS. UNTIL PROCEDURES ARE STANDARDIZED, LINK WORDS WILL BE INSERTED AT THE CENTRAL OFFICE.)

H. STATUS SYMBOLS

PROPERTIES THAT WILL BE USEFUL IN DIRECTING DATA RETRIEVAL FROM THE BASE ARE INDICATED BY 'STATUS SYMBOLS'. THE FOLLOWING LIST OF SYMBOLS REGISTERS WITH THE COLUMN AT THE LEFT SIDE OF EACH SPECIMEN SHEET. IF A PARTICULAR CONDITION IS TRUE FOR A SPECIMEN DESCRIPTION, PLEASE CIRCLE THE RELEVANT SYMBOL IN THE STATUS COLUMN OF THE SPECIMEN SHEET.

SPECIMEN LOCATION: LATITUDE AND LONGITUDE
- 1B TO NEAREST DEGREE ONLY.......................................1B
- 1C TO NEAREST TENTH OF DEGREE ONLY..............................1C
- 1D NOT LISTED OR SHOWN IN SOURCE REFERENCE.....................1D

'COMPLETENESS' OF ESSENTIAL OXIDE ANALYSIS
- 2A INCOMPLETELY SPECIFIED IN SOURCE DESCRIPTION................2A
- 2B ANALYSIS NORMALIZED TO 100% IN SOURCE........................2B
- 2C FE-OXIDE PARTITION NOT DETERMINED ON ANALYSED SPECIMEN.....2C
- 2D TOTAL IRON ONLY. STORED AS FEO, FE2O3, OR FE...............2D
- 2E TOTAL H2O NOT DIRECTLY DETERMINED...........................2E
- 2F H2O NOT PARTITIONED..2F
- 2G H2O+ IS LOSS ON IGNITION.....................................2G
- 2H SAMPLE AIR DRIED, DESSICATED DURING ANALYSIS................2H
- 2I SOME ESSENTIAL OXIDE(S) NOT DETERMINED.......................2I

ANALYTICAL PROCEDURES AND METHODS
- 3A RESULT AN AVERAGE FOR MULTIPLE ANALYSES OF SAME SPECIMEN...3A
- 3K RESULT AN AVERAGE OF ANALYSES OF 2 OR MORE SPECIMENS.......3K
- 3B COMPOSITE SAMPLE USED FOR ANALYSIS (BLOCK G INFO?).........3B
- 3L REPLICATE ANALYSIS OF SPECIMEN (BLOCK G INFO?).............3L
- 3M 'CORRECTION' OF AN EARLIER ANALYSIS..........................3M
- 3C ESSENTIAL OXIDES NOT QUOTED TO .01%..........................3C
- 3D ALKALIS DETERMINED BY FLAME PHOTOMETER......................3D
- 3E SOME ESSENTIAL OXIDES(S) DONE BY X-RAY FLUORESCENCE.........3E
- 3J ' ' ' ' ' ATOMIC ABSORPTION.......3J
- 3F ' ' ' ' ' ELECTRON PROBE..........3F
- 3G ' ' ' ' ' NEUTRON ACTIVATION......3G
- 3H ' ' ' ' ' WITH RADIATION OTHER THAN XRF, EPR, NAC, ATAB, FLFT.........3H
- 3I SOME TRACE ELEMENT(S) DETERMINED BY ARC SPECTROGRAPHY......3I

ASSOCIATED DATA RECORDED IN SOURCE DESCRIPTION
- 4J NO PETROGRAPHIC INFORMATION GIVEN IN SOURCE REFERENCE......4J
- 4K NO MINERALOGICAL INFORMATION GIVEN IN SOURCE REFERENCE.....4K
- 4A PETROG. DESC. GENERALIZED; MAY NOT APPLY TO ANAL. SPEC.....4A
- 4B MIN. ASSOC. GENERALIZED; MAY NOT APPLY TO ANAL. SPEC.......4B
- 4C STRAT. AGE INFERRED; MAY NOT APPLY TO ANAL. SPEC...........4C
- 4D PHYSICAL AGE INFERRED. NOT DETERMINED ON ANAL. SPEC........4D
- 4E QUANTITATIVE MODAL ANALYSIS OF ANALYSED SPECIMEN...........4E

PLEASE CIRCLE ALL RELEVANT SYMBOLS!

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TABLE 1. -- ALPHANUMERIC LIST OF IGBA ROCK NAMES

****

10	NOT NAMED IN SOURCE REF.
20	NOT NAMED IN IGBA SYSTEM
30	ABSAROKITE
40	ADAMELLITE
50	AGGLOMERATE
60	AGPAITE
70	AKERITE
80	ALASKITE
90	ALBANITE
100	ALBITITE
110	ALBORANITE
120	ALEUTITE
130	ALGARVITE
140	ALLIVALITE
150	ALNOITE,
160	CARBONATITE
170	AMPHIBOLITE
180	ANALCIMITE
190	ANDESITE,
200	BASALTIC
210	HIGH ALUMINA
220	LATITE
230	THOLEIITIC
240	TWO PYROXENE
250	ANKARAMITE
260	ANKARATRITE
270	ANORTHOSITE
280	APHANITE
290	APLITE
300	APLODIORITE
310	APLOGRANITE
320	APORHYOLITE
330	APPINITE
340	ASH
350	ATLANTITE
360	AUGITITE
370	BANAKITE
380	BANDAITE
390	BASALT,
400	ALKALI
410	ALKALI OLIVINE
420	ALKALI PICRITE
430	ANDESITE
440	ANKARAMITIC
450	CALC-ALKALINE
460	DOLERITIC
470	ESSEXITE
480	FERRO-
490	HIGH ALUMINA
500	HYPERSTHENE
510	LATITE
520	MUGEARITE
530	OLIVINE
540	PICRITE
550	QUARTZ
560	SPILITIC
570	THOLEIITIC
580	THOLEIITIC- PICRITE
590	TRACHYANDESITE
600	TRANSITIONAL
610	TWO PYROXENE
620	BASANITE,
630	PHONOLITIC
640	BASANITOID
650	BEFORSITE
660	BEKINKINITE
670	BENMOREITE,
680	PHONOLITIC
690	BERGALITE
700	BERONDRITE
710	BIOTITITE
720	BLAIRMORITE
730	BOMB
740	BOROLANITE
750	BOSTONITE,
760	QUARTZ
770	BRONZITITE
780	BUCHITE
790	BUCHONITE
800	CAMPANITE
810	CAMPTONITE
820	CARBONATITE
830	CECILITE
840	CHARNOCKITE
850	CHROMITITE
860	CIMINITE
870	CINERITE
880	COMENDITE,
890	TRACHYTIC
900	CRAIGNURITE
910	CRINANITE

920 CUMULATE
930 DACITE,
940   ANDESITE
950   CALC-ALKALINE
960   THOLEIITIC
970 DELLENITE
980 DIABASE,
990   ALKALI
1000   SPILITIC
1010   THOLEIITIC
1020 DIALLAGITE
1030 DIORITE,
1040   MICRO-
1050   QUARTZ
1060 DOLERITE,
1070   ALKALI
1080   QUARTZ
1090 DOMITE
1100 DOREITE
1110 DUNITE
1120 ECOLOGITE
1130 EKERITE
1140 ELVAN
1150 ENSTATITITE
1160 EPIDIORITE
1170 ESSEXITE,
1180   QUARTZ
1190 ETINDITE
1200 ETNAITE
1210 EUCRITE
1220 FARSUNDITE
1230 FASINITE
1240 FELSITE
1250 FENITE
1260 FLOW
1270 FORTUNITE
1280 FOURCHITE
1290 FOYAITE
1300 GABBRO,
1310   ALKALI
1320   ESSEXITE
1330   QUARTZ
1340   THERALITE
1350 GABBRODIORITE
1360 GABBRONORITE
1370 GAUTEITE
1380 GIBELITE
1390 GLASS
1400 GLENMUIRITE
1410 GLIMMERITE
1420 GRANITE,
1430   ALKALI
1440   MICRO-
1450   PERALKALINE
1460   RAPAKIVI
1470   SODA
1480   TWO MICA
1490 GRANODIORITE
1500 GRANOGABBRO
1510 GRANOPHYRE
1520 GREISEN
1530 GRORUDITE
1540 GUARDIAITE
1550 HAKUTOITE
1560 HARRISITE
1570 HARZBURGITE
1580 HAUYNITE
1590 HAUYNOPHYRE
1600 HAWAIITE
1610 HIGHWOODITE
1620 HORNBLENDITE
1630 HYALOTRACHYTE
1640 HYPERITE
1650 HYPERSTHENITE
1660 ICELANDITE,
1670   BASALTIC
1680 IGNIMBRITE
1690 IJOLITE
1700 INNINMORITE
1710 ITALITE
1720 JACUPIRANGITE
1730 JUMILLITE
1740 JUVITE
1750 KAJANITE
1760 KAKORTOKITE
1770 KATUNGITE
1780 KAUAIITE
1790 KENTALLENITE
1800 KENYITE
1810 KERATOPHYRE,
1820   QUARTZ
1830 KERSANTITE
1840 KIMBERLITE
1850 KIVITE
1860 KOMATIITE,
1870   BASALTIC
1880   PERIDOTITIC
1890 KOTUITE
1900 KULAITE
1910 LABRADORITE
1920 LAMPROITE
1930 LAMPROPHYRE
1940 LARDALITE
1950 LARVIKITE
1960 LATIANDESITE
1970 LATITE,
1980   QUARTZ
1990 LAVA
2000 LEDMORITE
2010 LEIDLEITE

2020	LEUCITITE
2030	LEUCITOPHYRE
2040	LHERZOLITE
2050	LIMBURGITE
2060	LINOSAITE
2070	LIPARITE
2080	LUGARITE
2090	LUJAVRITE
2100	LUSCLADITE
2110	LUSITANITE
2120	MADUPITE
2130	MAFRAITE
2140	MAGNETITITE
2150	MALIGNITE
2160	MANDSCHURITE
2170	MANGERITE
2180	MARSCOITE
2190	MELILITITE
2200	MELTEIGITE
2210	MIASKITE
2220	MICKENITE
2230	MIMOSITE
2240	MINETTE
2250	MISSOURITE
2260	MONCHIQUITE
2270	MONZODIORITE,
2280	QUARTZ
2290	MONZOGABBRO,
2300	QUARTZ
2310	MONZONITE,
2320	MICRO-
2330	QUARTZ
2340	MUGEARITE,
2350	SODA
2360	MURAMBITE
2370	MURITE
2380	NAUJAITE
2390	NEPHELINITE
2400	NEVADITE
2410	NGURUMANITE
2420	NILIGONGITE
2430	NORDMARKITE,
2440	MICRO-
2450	QUARTZ
2460	NORITE,
2470	MICRO-
2480	QUARTZ
2490	NOSELITITE
2500	OBSIDIAN,
2510	PERALKALINE
2520	OCEANITE
2530	ODINITE
2540	OKAITE
2550	OLIVINITE
2560	ONGONITE
2570	OPHIOLITE
2580	ORDANCHITE
2590	ORENDITE
2600	ORTHOSITE
2610	ORVIETITE
2620	OTTAJANITE
2630	OUACHITITE
2640	PAISANITE
2650	PALAGONITE
2660	PANTELLERITE
2670	PEGMATITE,
2680	MICRO-
2690	PELE'S HAIR
2700	PEPERINO
2710	PERIDOTITE
2720	PERKNITE
2730	PERLITE
2740	PERTHOSITE
2750	PHANERITE
2760	PHONOLITE,
2770	ALKALI
2780	BASANITIC
2790	LATITE
2800	TEPHRITIC
2810	PICOTITITE
2820	PICRITE
2830	PITCHSTONE
2840	PLAGIOGRANITE
2850	PLAGIOLIPARITE
2860	PLAGIOTRACHYTE
2870	PORPHYRY (PORPHYRITE)
2880	FELDSPAR
2890	QUARTZ
2900	RHOMB
2910	PSEUDOTACHYLITE
2920	PULASKITE
2930	PUMICE
2940	PYROXENITE,
2950	CLINO-
2960	ORTHO-
2970	RAPAKIVI
2980	RAUHAUGITE
2990	RHYOBASALT
3000	RHYODACITE
3010	RHYOLITE,
3020	ALKALI
3030	CALC-ALKALINE
3040	PERALKALINE
3050	SODA
3060	THOLEIITIC
3070	TRACHYTIC
3080	RINGITE
3090	ROCKALLITE
3100	RODINGITE

3110 RONGSTOCKITE
3120 ROUGEMONTITE
3130 RUSHAYITE
3140 SAKALAVITE
3150 SANCYITE
3160 SANIDINITE,
3170   SODA
3180 SANTORINITE
3190 SANUKITE
3200 SAXONITE
3210 SCORIA
3220 SELBERGITE
3230 SERPENTINITE
3240 SHACKANITE
3250 SHIHLUNITE
3260 SHONKINITE
3270 SHOSHONITE
3280 SIDEROMELANE
3290 SILEXITE
3300 SOLVSBERGITE
3310 SOVITE
3320 SPESSARTITE
3330 SPILITE
3340 SUSSEXITE
3350 SYENITE,
3360   ALKALI
3370   MICRO-
3380   NEPHELINE
3390   PERALKALINE
3400   QUARTZ
3410   RAPAKIVI
3420 SYENODIORITE
3430 SYENOGABBRO
3440 TACHYLITE (TACHYLYT)
3450 TAHITITE
3460 TANNBUSCHITE
3470 TAUTIRITE
3480 TEPHRA
3490 TEPHRITE,
3500   ANDESITE
3510   BASALTIC
3520 TEPHRITOID
3530 TESCHENITE,
3540   PICRITE
3550 THERALITE,
3560   ESSEXITE
3570 THOLEIITE,
3580   HIGH ALUMINA
3590   LOW ALUMINA
3600   OLIVINE
3610 TINGUAITE
3620 TONALITE
3630 TORDRILLITE
3640 TOSCANITE
3650 TRACHYANDESITE
3660 TRACHYBASALT
3670 TRACHYBASANITE
3680 TRACHYDACITE
3690 TRACHYDOLERITE
3700 TRACHYLIPARITE
3710 TRACHYPHONOLITE
3720 TRACHYTE,
3730   ALKALI
3740   MUGEARITE
3750   PANTELLERITIC
3760   PERALKALINE
3780   QUARTZ
3790   RHYOLITIC
3800   SODA
3810   TEPHRITIC
3820 TRACHYTEANDESITE
3830 TRACHYVICOITE
3840 TRAP (TRAPP)
3850 TRISTANITE
3860 TROCTOLITE
3870 TRONDHJEMITE
3880 TUFF
3890 TURJITE
3900 UGANDITE
3910 ULTRAMAFITE
3920 UMPTEKITE
3930 UNCOMPAHGRITE
3940 URTITE
3950 VARIOLITE
3960 VENAZITE
3970 VERITE
3980 VESUVITE
3990 VICOITE
4000 VITROPHYRE
4010 VOGESITE,
4020   SODA
4030 VULSINITE
4040 WEBSTERITE
4050 WEHRLITE
4060 WELDED TUFF
4070 WOODENITE
4080 WYOMINGITE
4090 YAMASKITE
4100 ZWITTER