STATE OF DELAWARE
DEPARTMENT OF STATE
Division of Historical and Cultural Affairs
Hall of Records
Dover, Delaware 19901

~~XXXXXXXXXXXXXXXXXXXXXXXX~~
~~DIRECTOR~~

May 8, 1973

Mrs. Willis Messick
Fruitland,
Maryland

Dear Mrs. Messick:

I have been able to receive data on the chemical composition of three of the beads recovered at 18WO 23. The Winterthur Museum Research laboratory, under the direction of Mr. Victor Hansen, ran an X-ray flourescence test and determined the following composition:

Copper	99.62% by weight
Iron	.52%
Zince	.10%
Manganese	.16%
Cobalt	.002
Nickel	.004
Arsenic	.006
Gold	Trace perhaps
Bismuth	.004
Silver	.008
Cadmium	.001
Indium	.001
Antemony	.001

As you can see, the beads are almost pure copper. In fact, they were more pure than the reference sample they use at the lab. What this means is the natural copper used cannot be traced to a place of origin by this analytical m method. I will keep you informed of any further developments.

Sincerely yours,

Ron

Ronald A. Thomas
State Archaeologist

RAT:pkg

6909 Holter Vista Drive
Frederick, MD 21701
Aug. 27, 1983

Mr. Tyler Bastian, Division of Archaeology
Maryland Geological Survey
The Rotunda
711 W. 40th Street, Suite 440
Baltimore, MD 21211

Dear Mr. Bastian:

Thank you for the data collected at the Winterthur Museum Research Laboratory on the Nassawango beads.

Enclosed are data collected by Nelson E. Alexander using X-ray analyses on three different scanning electron microscopy systems while attending the annual meeting of the Electron Microscopy Society of America. I have enclosed copies of the sample code and description along with results from each of the three instruments. Each of these sets are fastened together with a paperclip.

Conclusions from the results, which are very preliminary, are essentially the same as those arrived at by Mr. Thomas from the Winterthur data. However I believe there is one problem that is common to both sets of data. The copper specimens being examined are not homogeneous. The elements, other than copper, are not necessarily complexed with the copper but are more likely scattered throughout the copper much as native copper is distributed in or on its matrix.

It may be possible for Mr. Alexander to have replicate assays performed at the National Institutes of Health. Based upon our telephone conversation August 24 I have left one bead with him which he will have sliced to provide several relatively large surfaces from which a number of replicate assays can be done. It may then be possible to select another assay technique that will provide a more reliable estimate of the trace elements present and their concentrations.

I will keep you and Dr. Davidson informed of progress. So far the cost has been a few hours of volunteer labor and one bead. However negotiations to get free analysis time takes time and progress is likely to be in spurts rather than at a steady rate.

Sincerely,

Ed Seligmann

Edward B. Seligmann Jr.

SEM Stub No	Sample description
I 1	Bead Lot # 195 555
II 2	Clark Mine, Keweenau Peninsula Mich.
III 3	Nonsuch Mine, near White Pine, Mich.
IV 4	Osceola Mine #18, Calumet, Mich.
5 V	Raven Rock Mt. Penna.
6 - VI	Greenstone, Penna
7 - VII	Mt. Hope, Penna
8	Raven Rock Mt. PA.

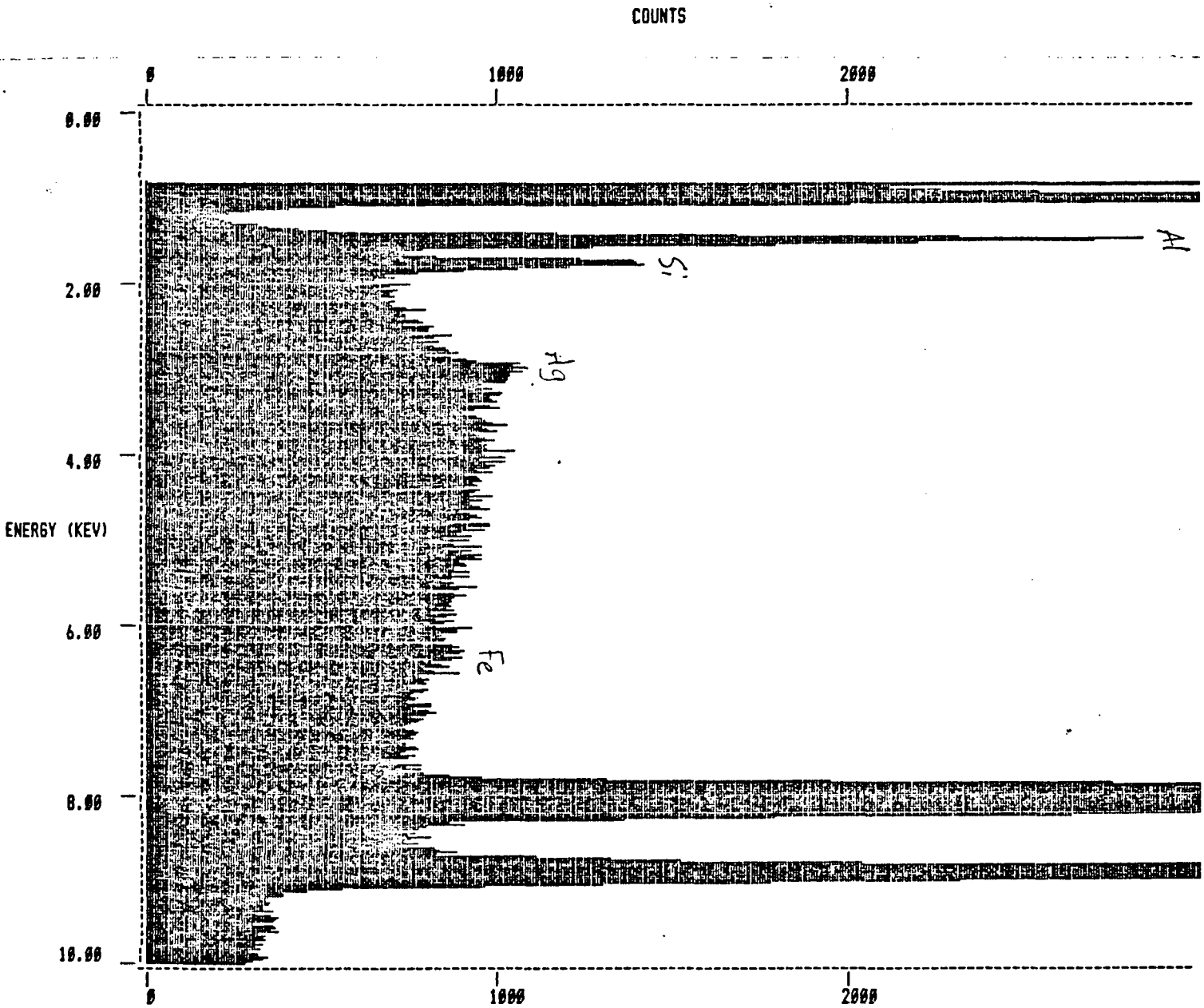
JEOL - JSM T300
w PGT - system 4
10 Aug 1983

BEAD - #1
site-1

SPECTRUM LABEL

SPECTRUM FILE NAME

BEAD



γ PIGITI

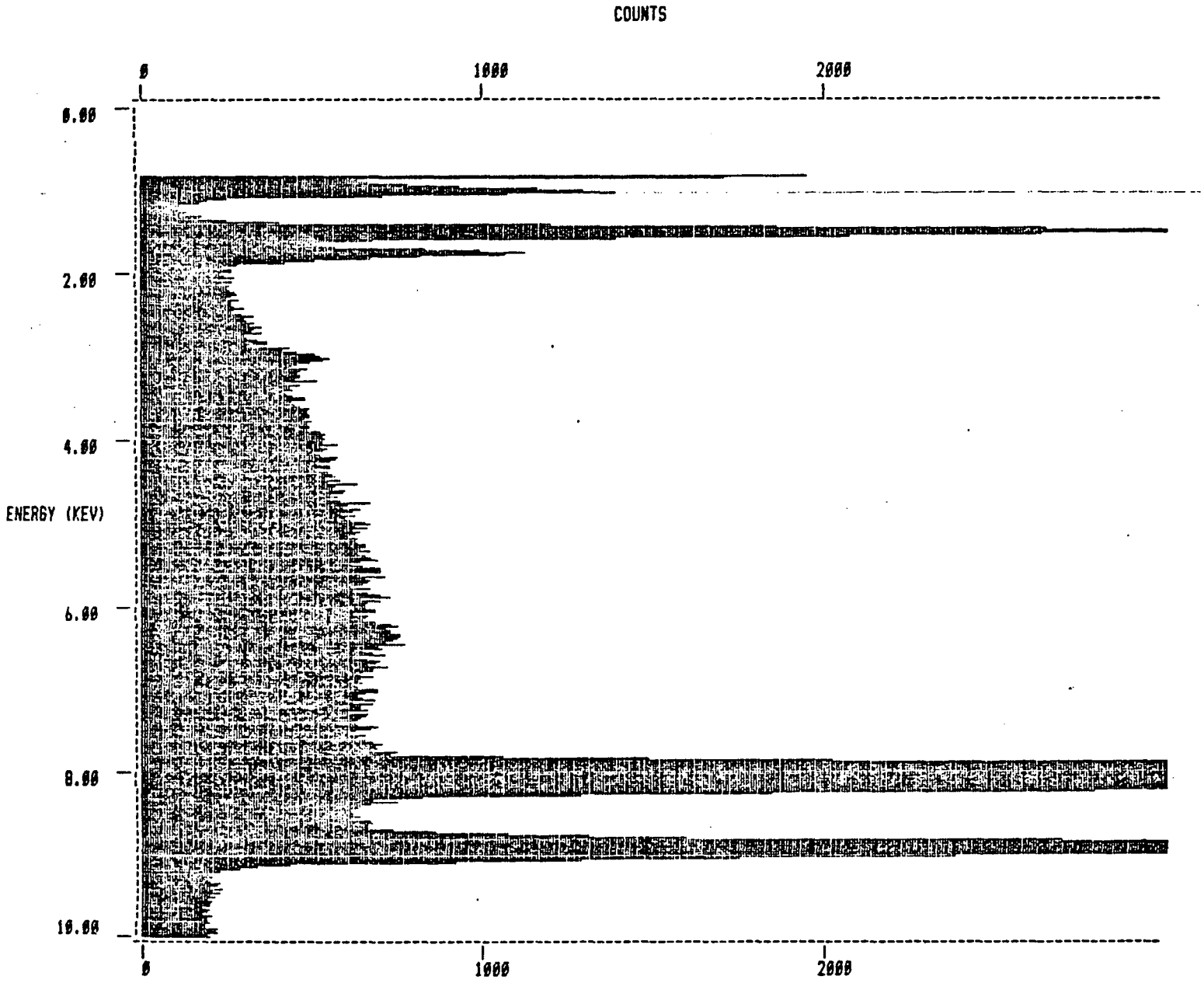
JEOL - JSM T300 - Princeton Gamma Tech.
w/ PGT System #1

BEAD SITE 2

SPECTRUM LABEL 10 Aug 1983

SPECTRUM FILE NAME

BEAD



γ PIGITI

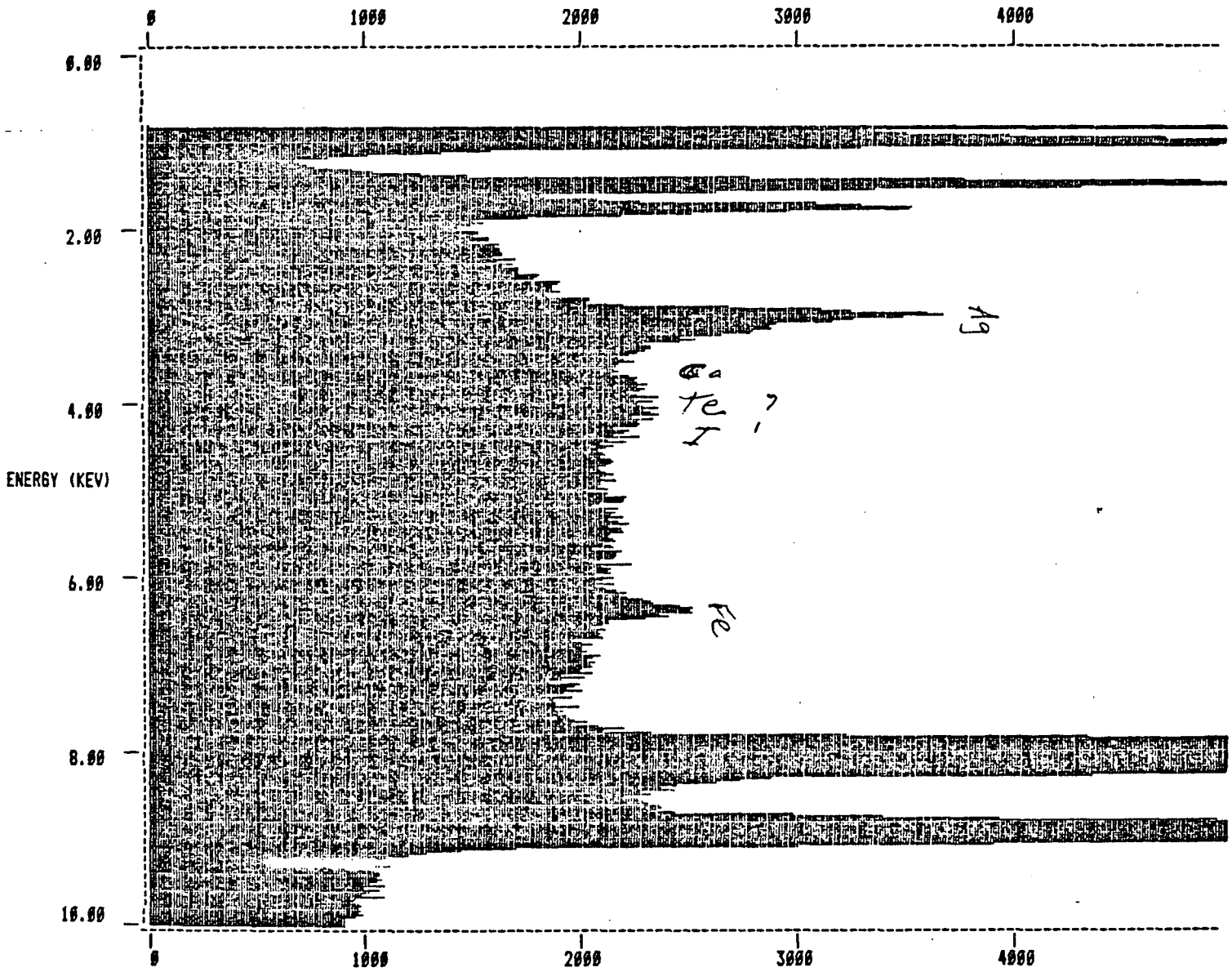
JEOL. JSM T300
w/ PGT System 4
16 Aug 1983

CLARK MINE MI - 2 #

SPECTRUM LABEL

SPECTRUM FILE NAME

COUNTS



γ PIGITI

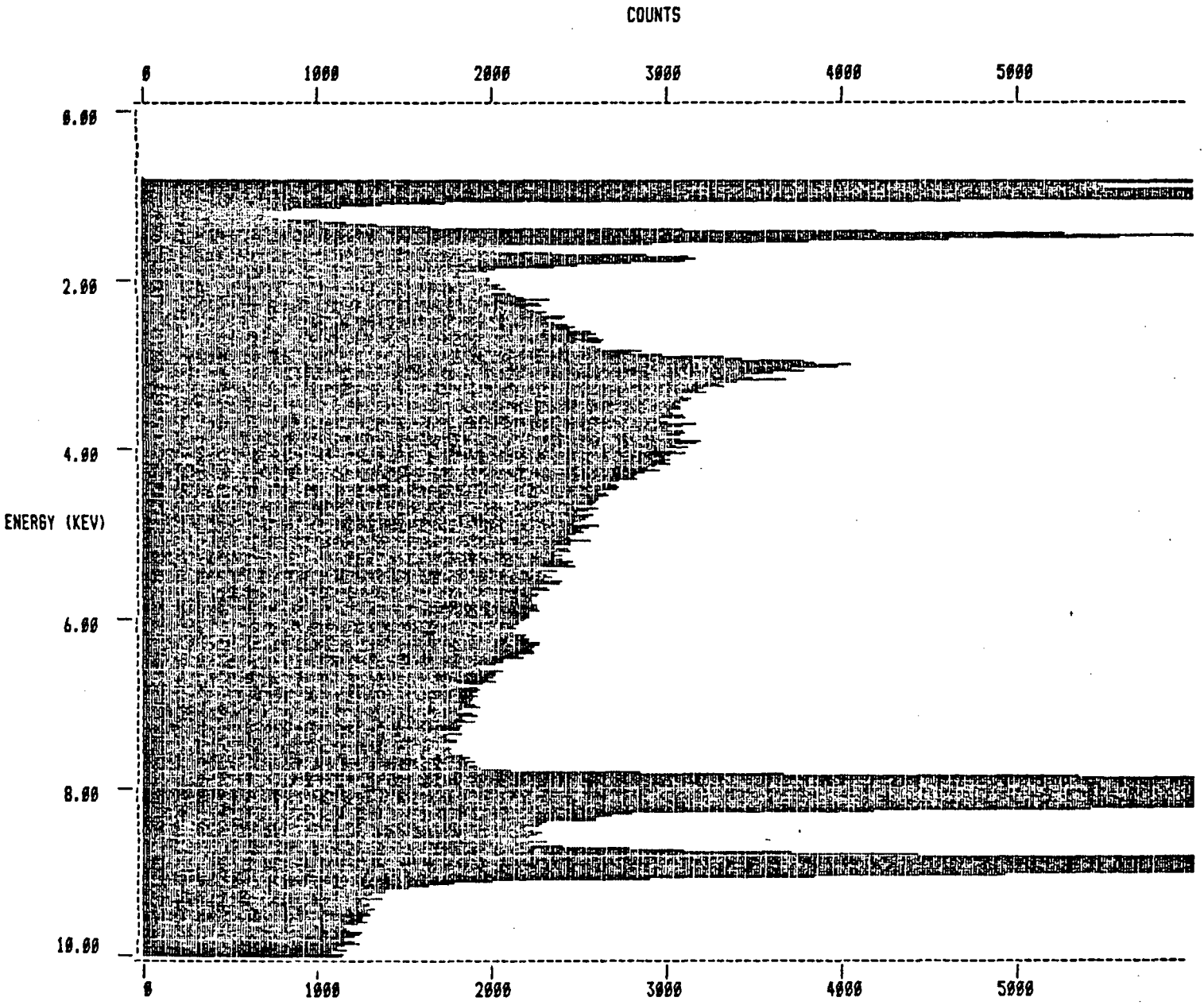
JEOL - SSMT-30
w/ PGT System 4
16 Aug 1983

NONSUCH MINE - 3

SPECTRUM LABEL

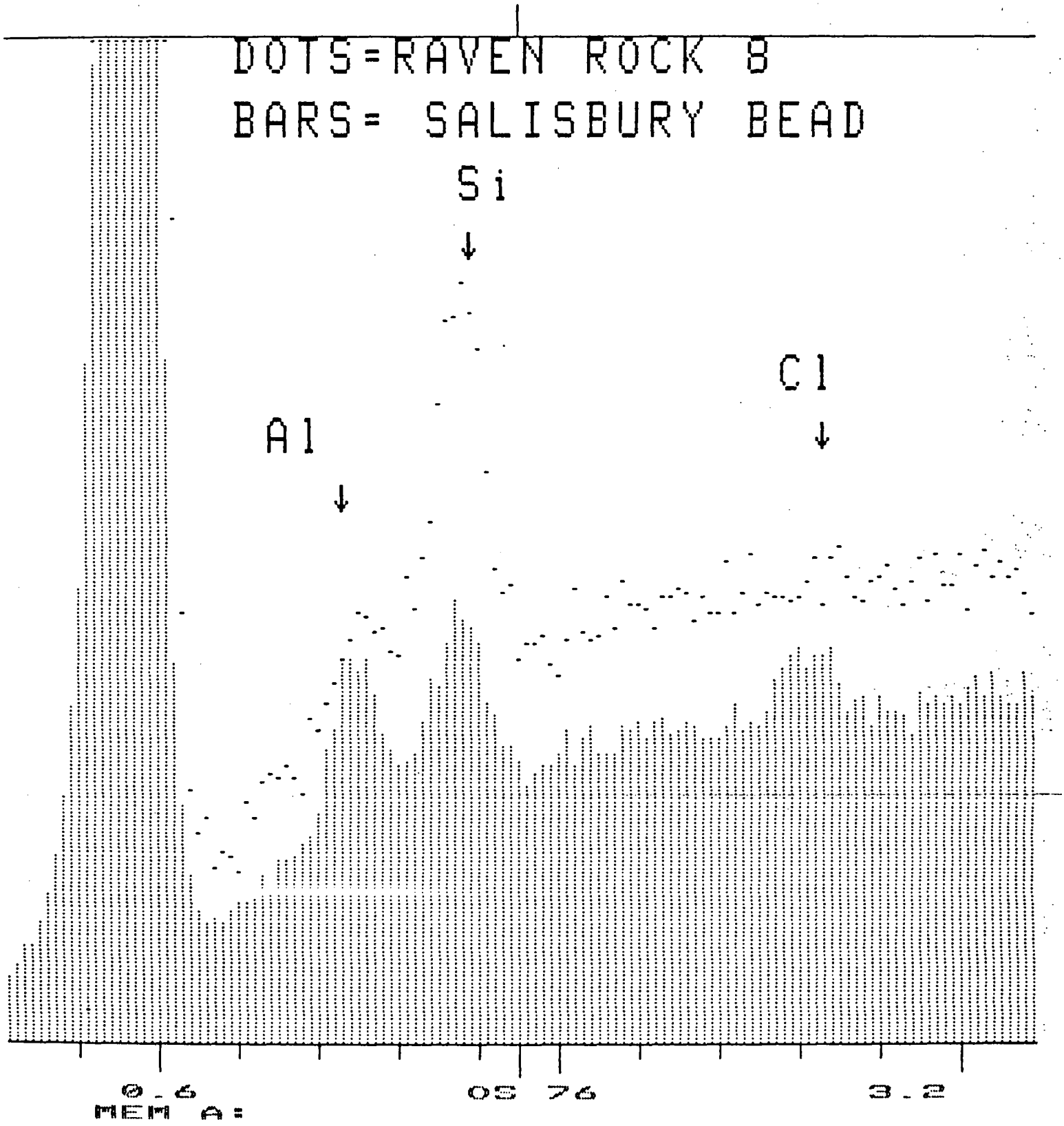
SPECTRUM FILE NAME

BEAD

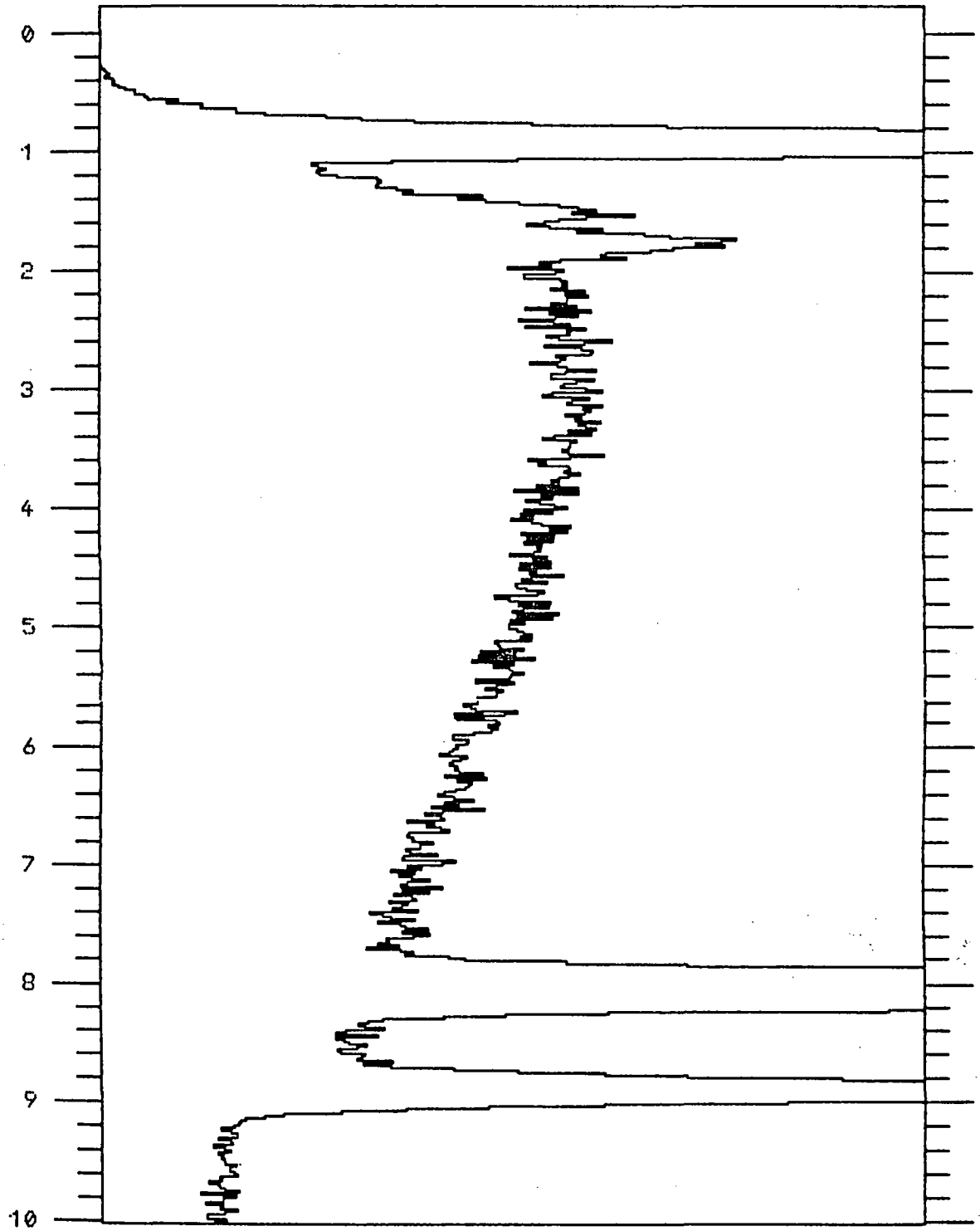


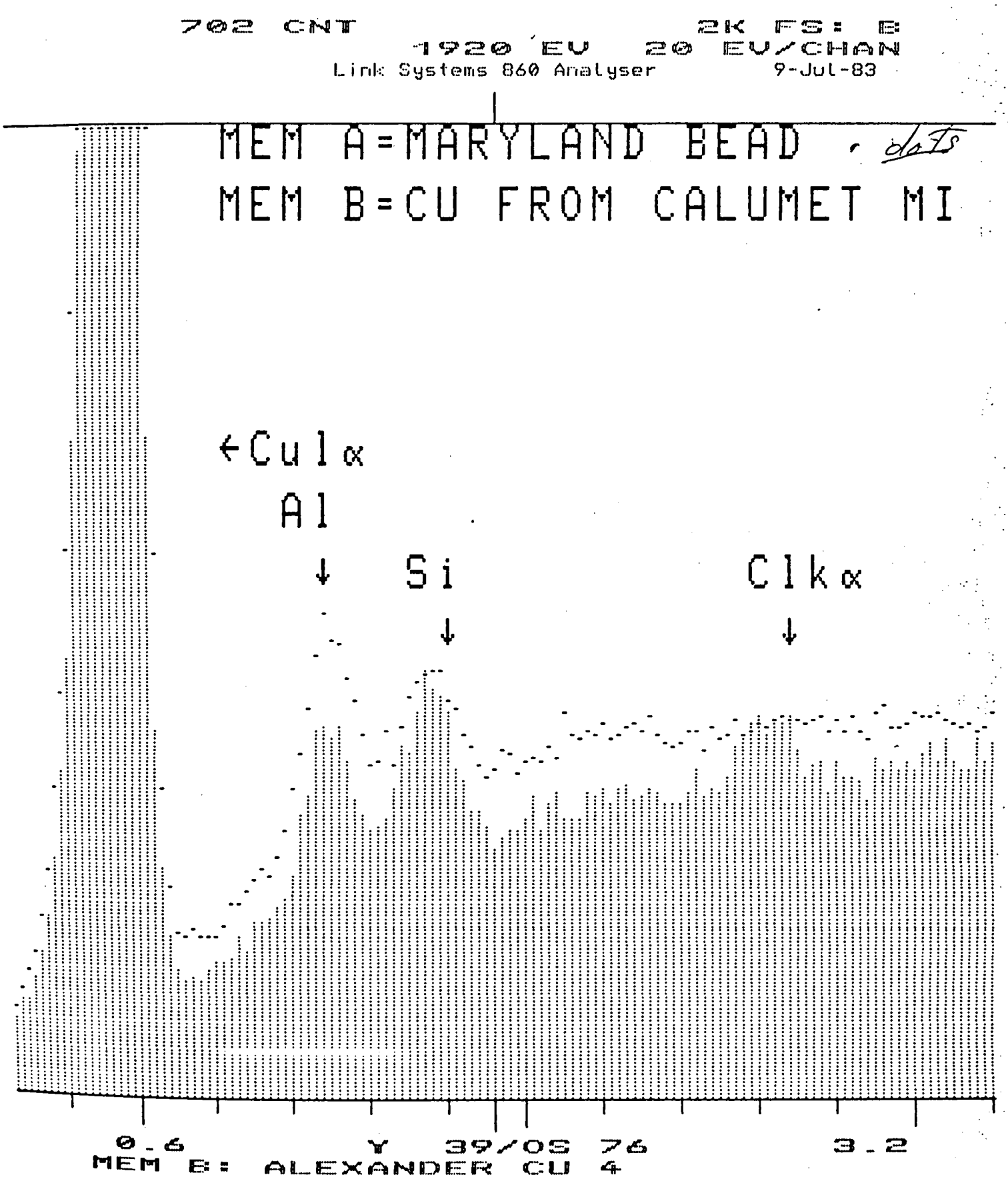
PIGITI

395 CNT 1K FS: B
1900 EV 20 EV/CHAN
Link Systems 860 Analyser 10-Aug-83

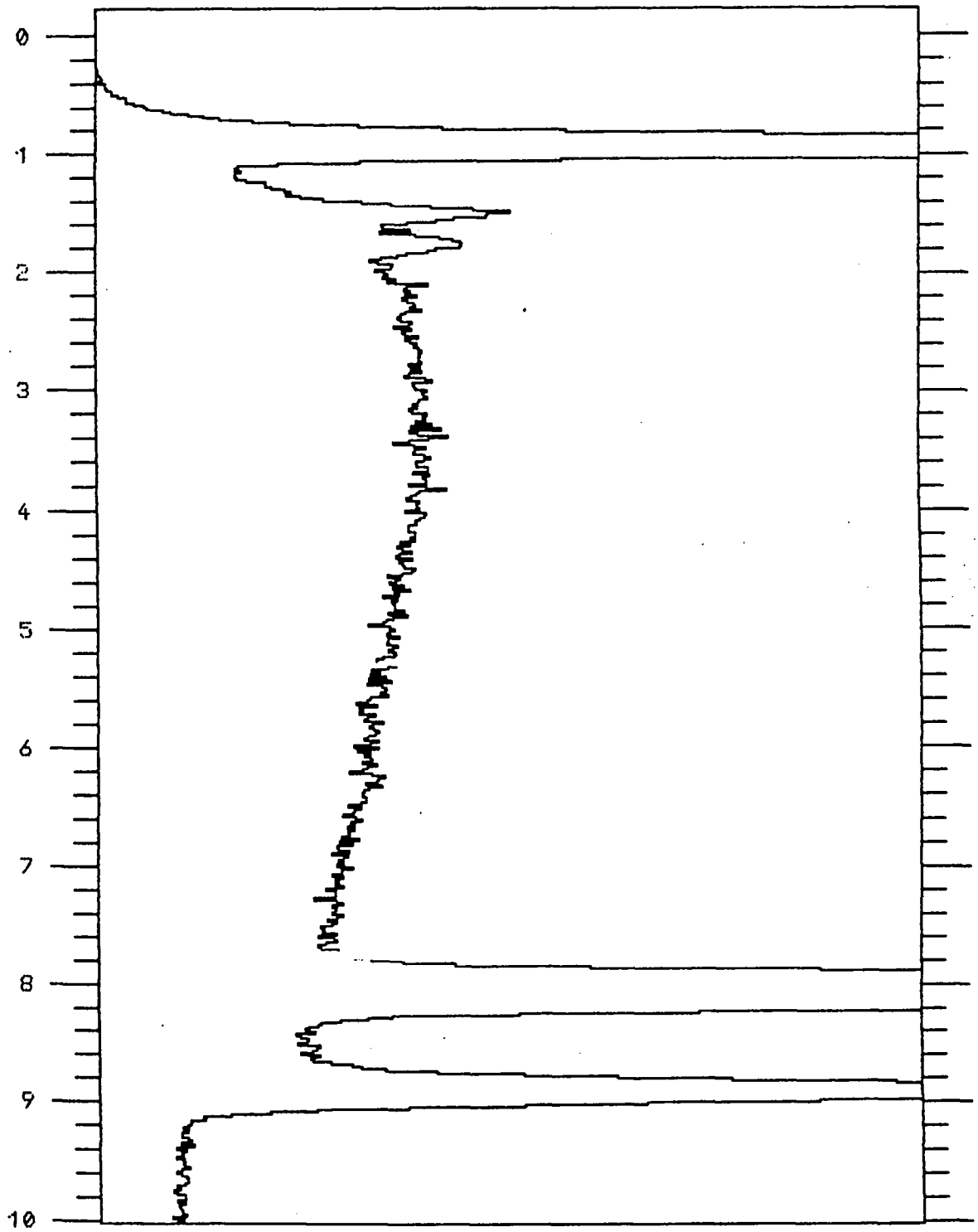


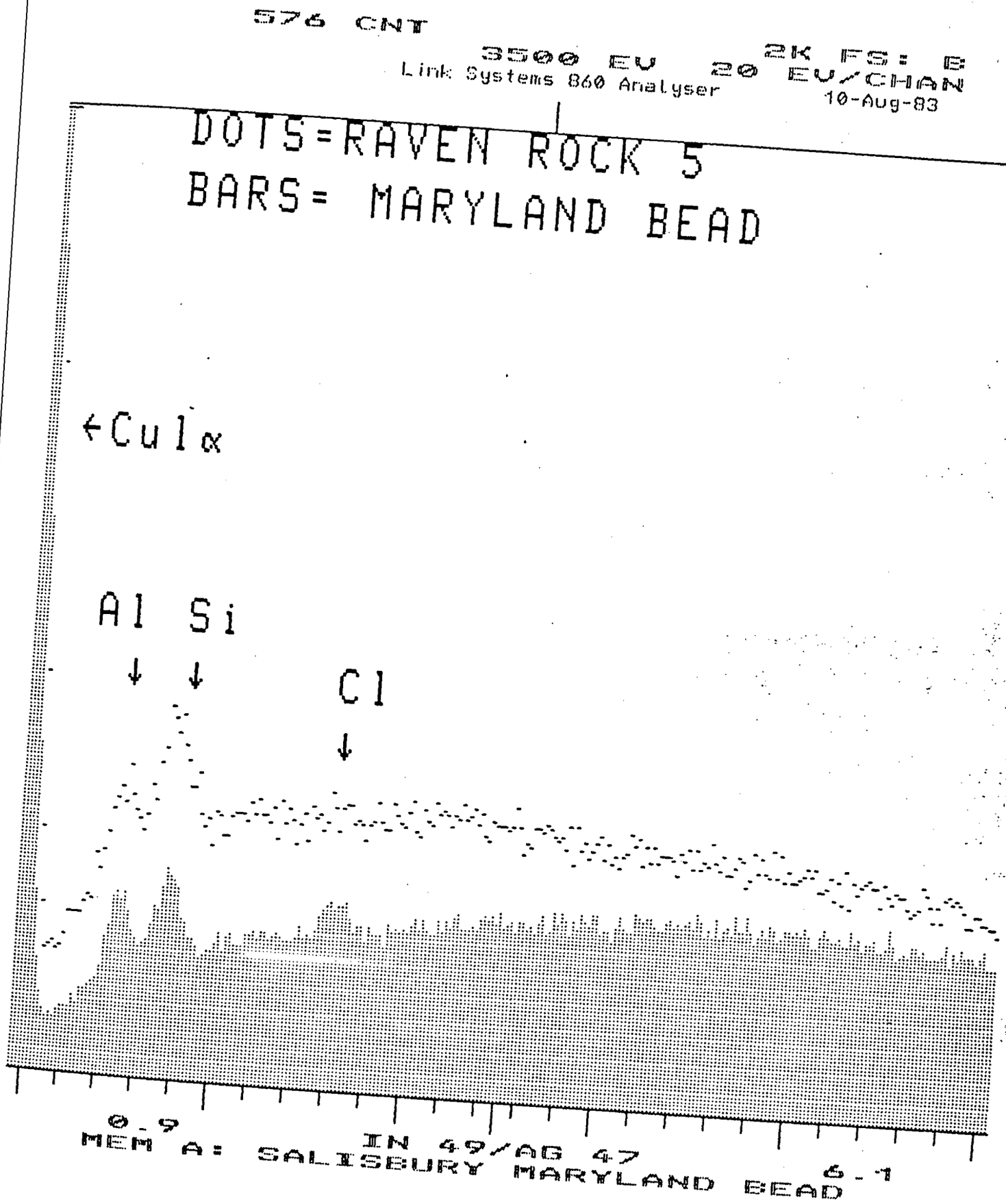
RAVEN ROCK MT COPPER 1K FS: B
20 EV/CHAN, LIVE TIME = 112 SECS
SPECTRUM LENGTH = 1024 CHAN




702 CNT
2K FS: B
1920 EV 20 EV/CHAN
Link Systems 860 Analyser
9-Jul-83
MEM A=MARYLAND BEAD
MEM B=CU FROM CALUMET MI
←Cu1α
Al
Si
Clkα
0.6
Y 39/OS 76
3.2
MEM B: ALEXANDER CU 4

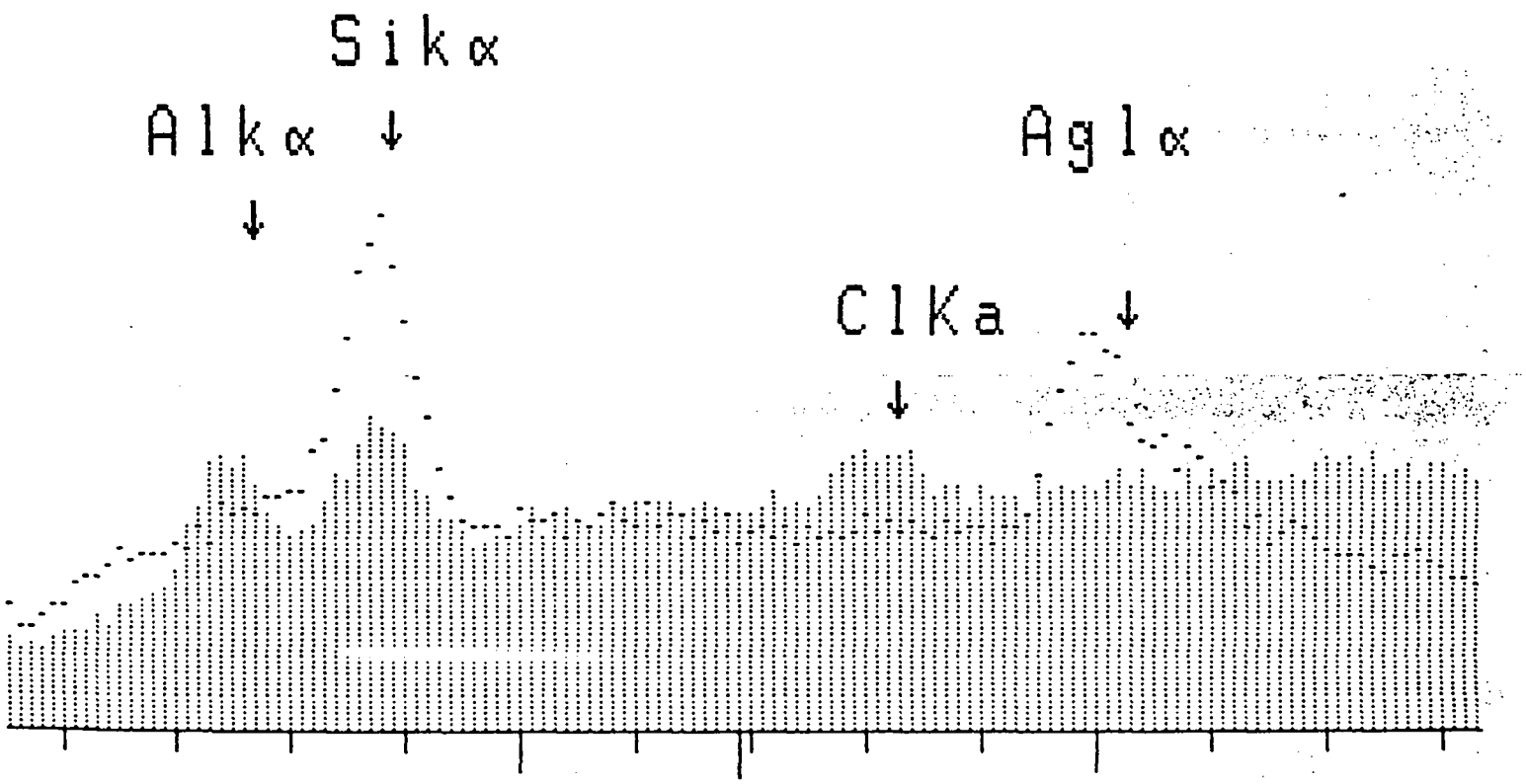
ALEXANDER CU 4 4K FS: B
20 EV/CHAN, LIVE TIME = 1308 SECS
SPECTRUM LENGTH = 1024 CHAN




576 CNT
3500 EV 20 EV/CHAN 2K FS: B
Link Systems 860 Analyser
10-Aug-83
DOTS=RAVEN ROCK 5
BARS= MARYLAND BEAD
←Cu lα
Al
Si
Cl
0.9
6.1
MEM A: SALISBURY MARYLAND BEAD
IN 49/AG 47

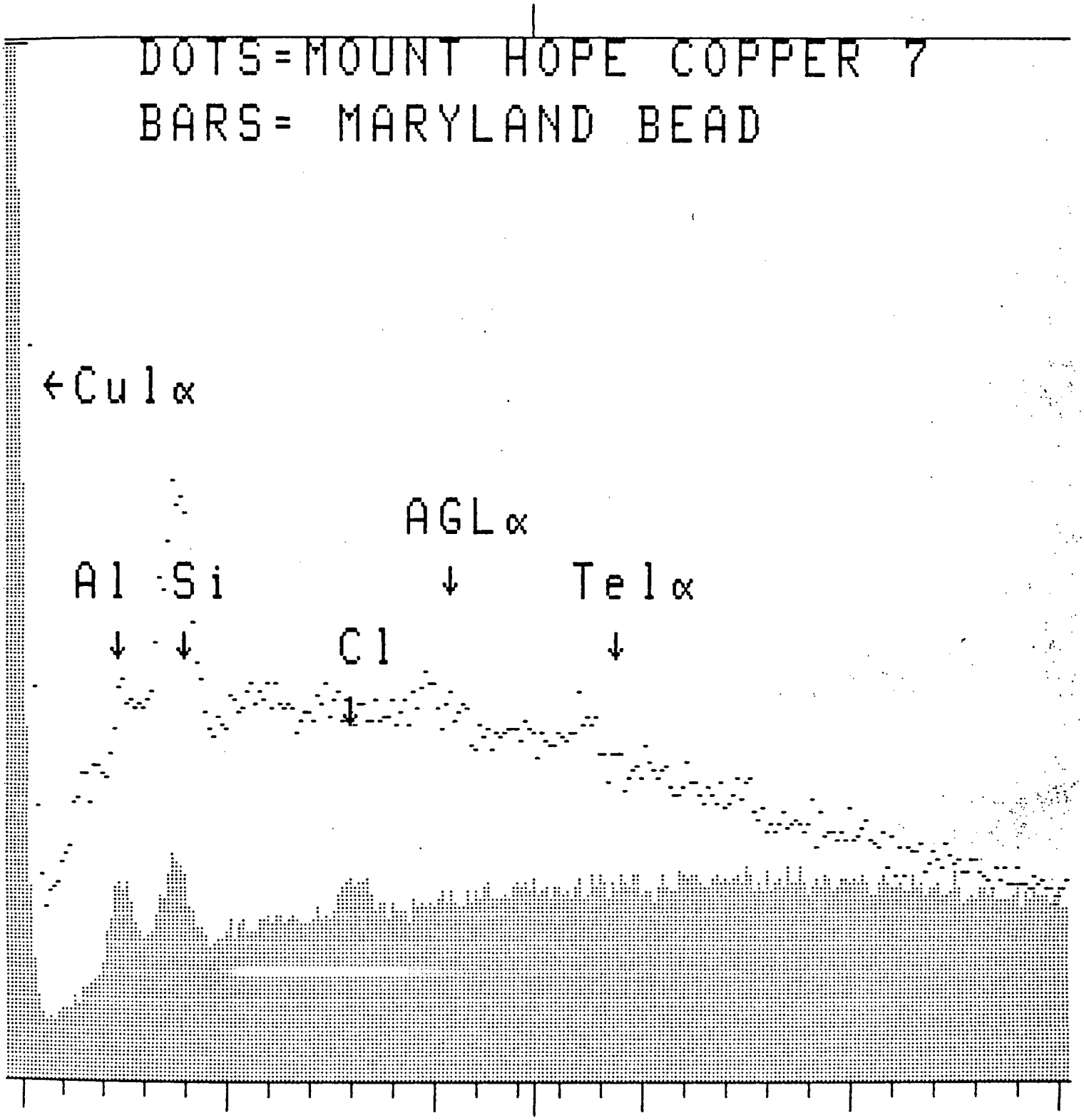
555 CNT 4K FS: B
2380 EV 20 EV/CHAN
Link Systems 860 Analyser 10-Aug-83

DOTS=GREENSTONE COPPER
BARS=MARYLAND BEAD



MEM B: GREENSTONE PA COPPER

693 CNT 2K FS: B
3480 EV 20 EV/CHAN
Link Systems 860 Analyser 10-Aug-83



MEM A: SALISBURY MARYLAND BEAD

SPECTRUM: ALEXANDER CU 4

GAIN	=	20	EV/CHAN
SPECTRUM LENGTH	=	1024	CHANS
PRESET LIVE TIME	=	65535	SECS
ACTUAL LIVE TIME	=	1308	SECS
PRESET INTEGRAL	=	65535	CNTS

WINDOW LABEL	WINDOW CENTRE	FIRST CHAN	LAST CHAN	NET INTEGRAL	EFF. FACTOR	%AGE TOTAL
AL	1460	1360	1580	2005	1.00	1.24
SI	1780	1640	1920	885	1.00	0.55
CL	2600	2500	2720	129	1.00	0.08
CU	8000	7700	8320	158790	1.00	98.14

SPECTRUM: SALISBURY MARYLAND BEAD

GAIN	=	20	EV/CHAN
SPECTRUM LENGTH	=	1024	CHANS
PRESET LIVE TIME	=	65535	SECS
ACTUAL LIVE TIME	=	209	SECS
PRESET INTEGRAL	=	65535	CNTS

WINDOW LABEL	WINDOW CENTRE	FIRST CHAN	LAST CHAN	NET INTEGRAL	EFF. FACTOR	%AGE TOTAL
AL	1460	1360	1580	1546	1.00	0.93
SI	1780	1640	1920	2301	1.00	1.38
CL	2600	2500	2720	1055	1.00	0.63
CU	8000	7700	8320	161599	1.00	97.06

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ISI - SS40 Scanning
Electron Microscope

EDAX - 9100 family
System 70

Kα & Kβ cu. - L series cu.
Al, Si, Cl

LIST-% :
LABEL = NONSUCH 3
10-AUG-83 15:50:17
147.156 LIVE SECONDS

ELEM	CPS	WT % ELEM
AL K	7.295	0.219
SI K	10.153	0.269
FE K	2.985	0.170
CU K	824.134	99.343

LIST-% :
LABEL = RAVEN ROCK 8
10-AUG-83 16:09:41
176.672 LIVE SECONDS

ELEM	CPS	WT % ELEM
AL K	5.943	0.151
SI K	13.154	0.294
MG K	12.628	0.957
FE K	2.038	0.123
CU K	956.281	98.475

LIST-% :
LABEL = NONSUCH 3/2
10-AUG-83 15:57:09
209.066 LIVE SECONDS

ELEM	CPS	WT % ELEM
AL K	1.932	0.103
SI K	5.180	0.243
FE K	1.282	0.162
CU K	465.336	99.492

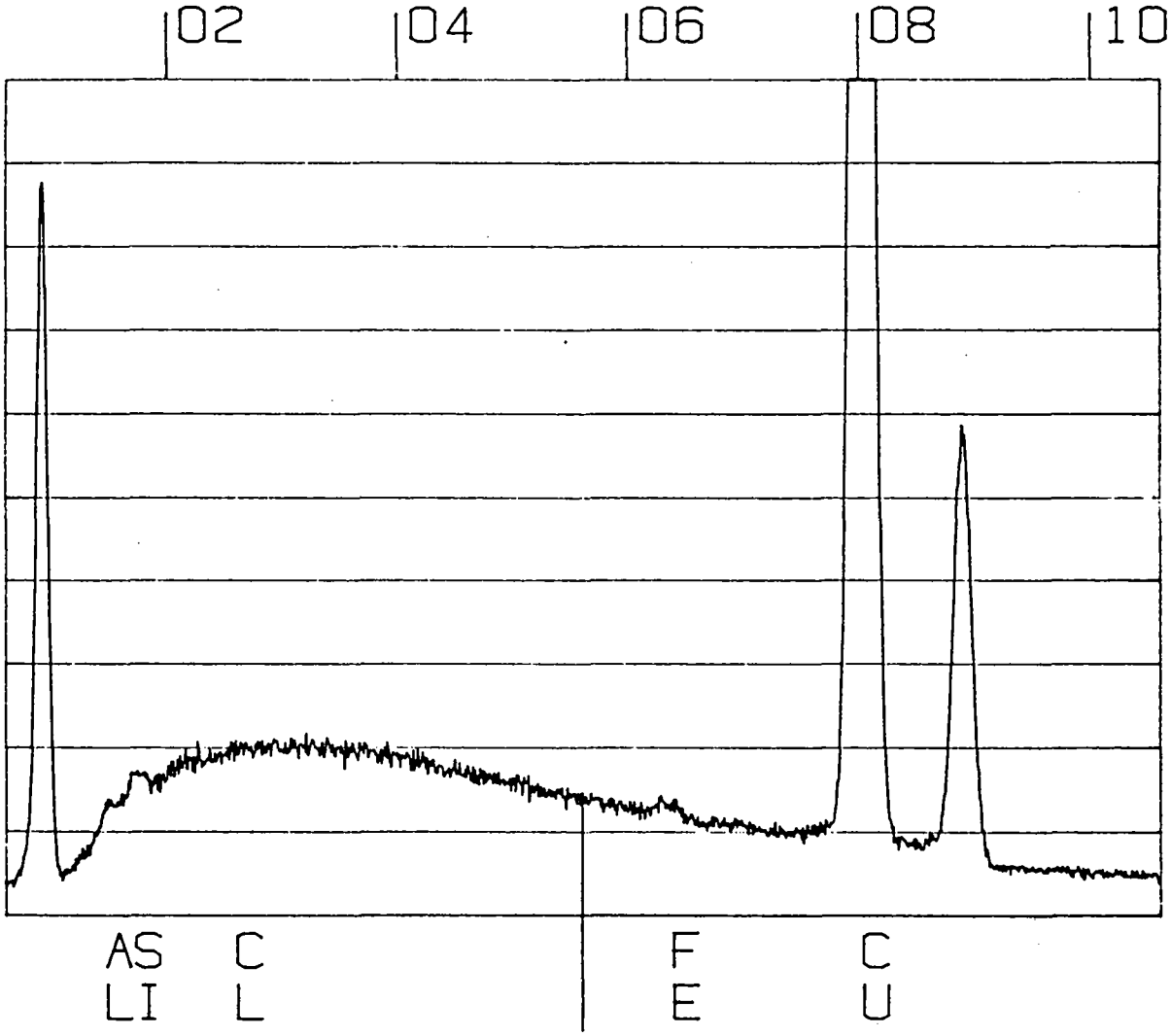
LIST-% :
LABEL = INDIAN B1/2
10-AUG-83 15:38:03
221.043 LIVE SECONDS

ELEM	CPS	WT % ELEM
AL K	5.338	0.104
SI K	6.388	0.110
CL K	5.099	0.100
FE K	1.312	0.061
CU K	1268.034	99.625

LIST-% :
LABEL = INDIAN B1
10-AUG-83 15:29:29
342.002 LIVE SECONDS

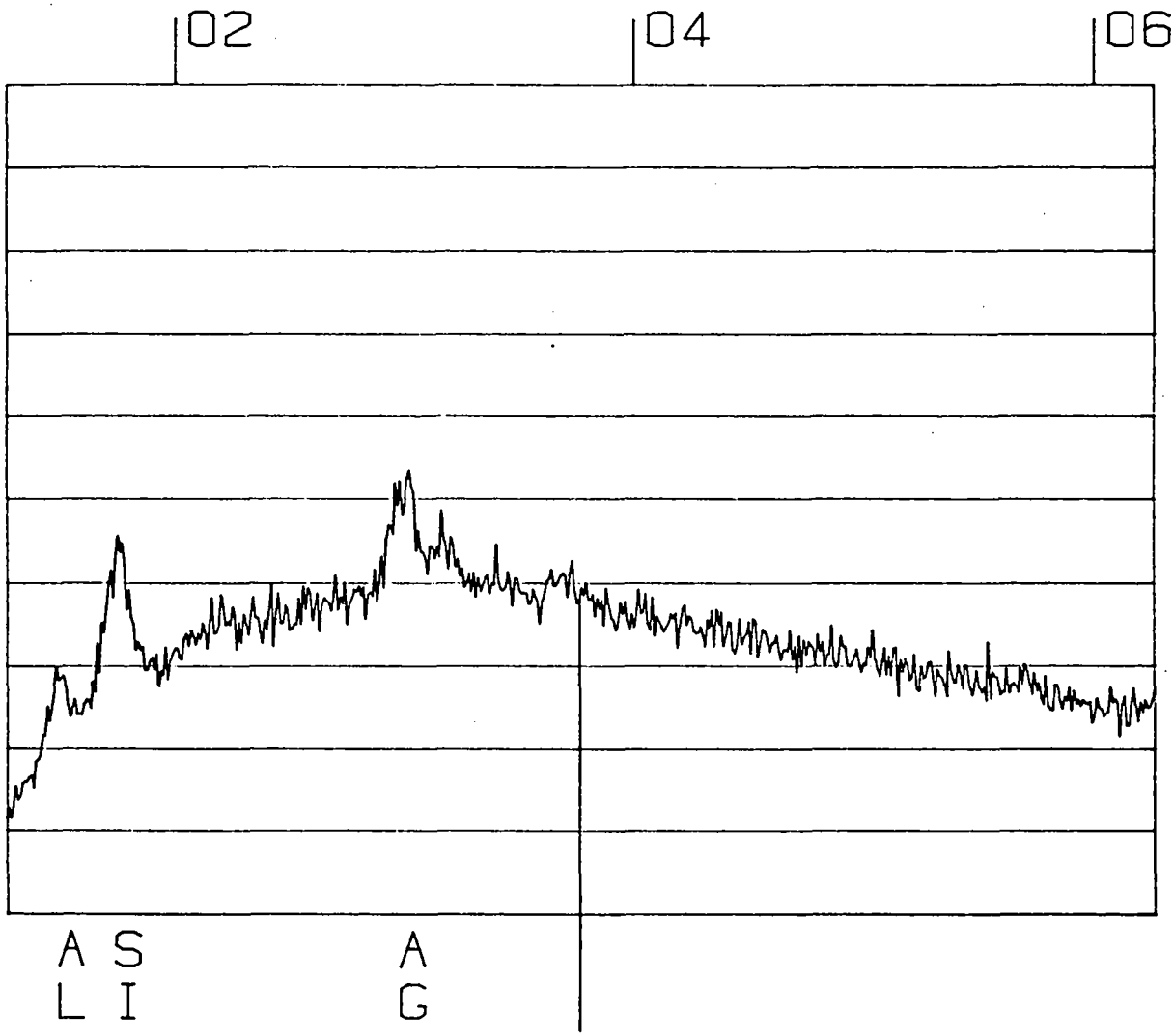
ELEM	CPS	WT % ELEM
AL K	3.386	0.119
SI K	3.272	0.102
CL K	4.892	0.172
FE K	1.289	0.108
CU K	702.452	99.499

10-AUG-83 15:38:42
RATE: CPS TIME 221LSEC
00-20KEV: 10EV/CH PRST: OFF
A: INDIAN B1/2 B:
FS= 5172 MEM: A FS= 50



CURSOR (KEV) =05.600 EDAX

10-AUG-83 16:11:15
RATE: CPS TIME 177LSEC
00-20KEV: 10EV/CH PRST: OFF
A: RAVEN ROCK 8 B:
FS= 1566 MEM: A FS= 25



CURSOR (KEV) =03.760 EDAX

6909 Holter Vista Drive
Frederick, MD 21701
Sept. 10, 1983

Dr. T. E. Davidson
Dep't of Sociology and Anthropology
Salisbury State College
Salisbury, MD 21801

Dear Tom,

Thanks for the loan of the beads. I am returning all except one from lot #195sss. That is the on;y one that Nelson Alexander assayed and he will perform additional testing of it at the National Institutes of Health. I will send you copies of all the data when that testing has been completed and I will keep both you and Mr. Tyler Bastian informed of progress. I have not received anymore information from him since I talked to you.

Sincerely,

Ed

Edward B. Seligmann Jr.

195 bbb
195 sss