

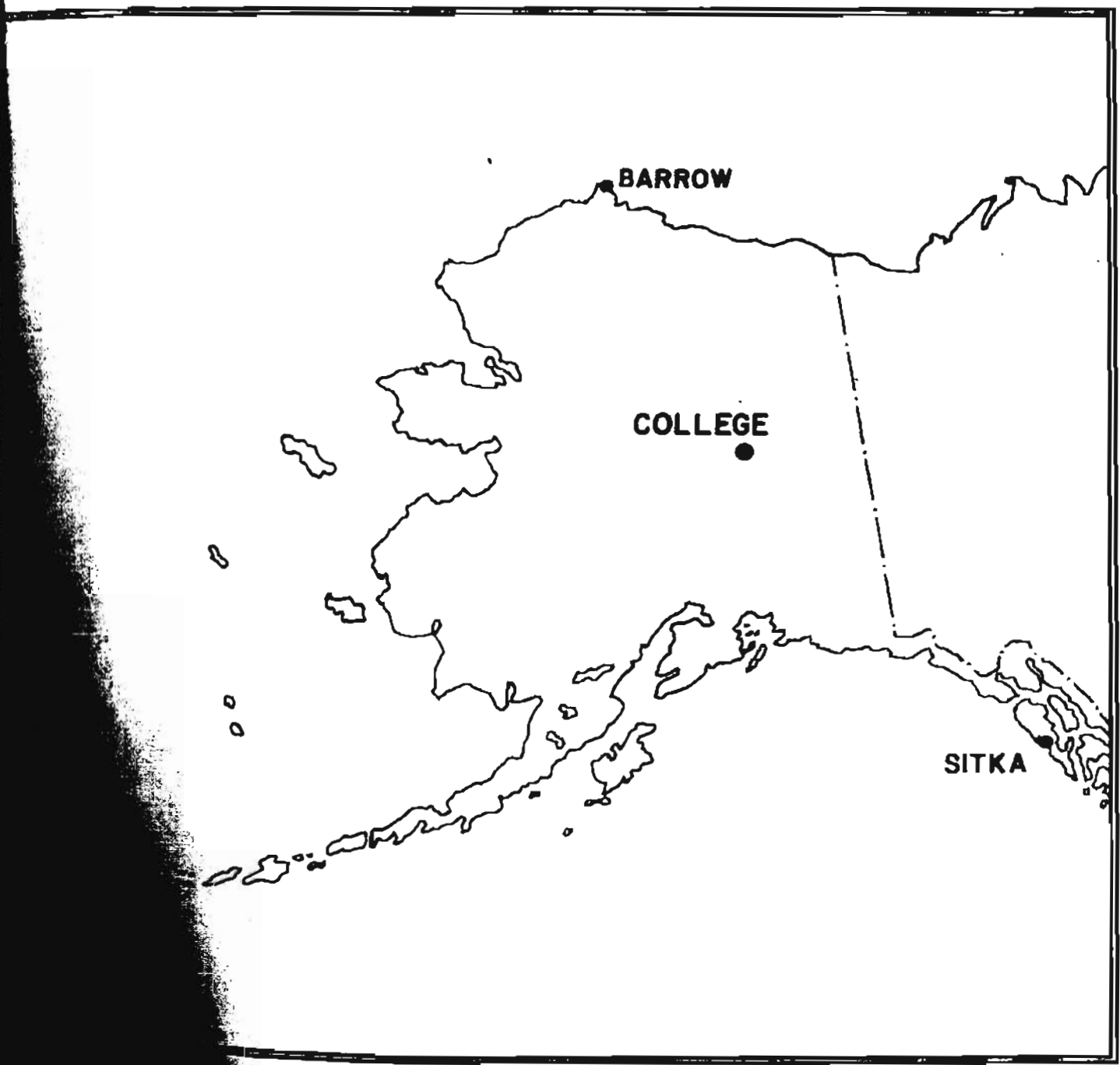
UNITED STATES (DEPARTMENT OF THE INTERIOR)

GEOLOGICAL SURVEY. *[Reports - Open file series]*

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

FEBRUARY 1977

OPEN FILE REPORT 77-300B



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Normal Magnetograms

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THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY WITH THE ASSISTANCE OF OBSERVATORY STAFF MEMBERS J. E. PAPP, M. J. MOORMAN, C. E. DEADMON, AND S. P. TILTON, AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. THE COLLEGE OBSERVATORY IS A PART OF THE BRANCH OF ELECTROMAGNETISM AND GEOMAGNETISM.

COLLEGE OBSERVATORY PRELIMINARY GEOMAGNETIC DATA

INTRODUCTION

The preliminary geomagnetic data included here is made available to scientific personnel and organizations, as part of a cooperative effort and on a data exchange basis because of the early need by some users. To avoid delay, all of the data is copied from original forms processed at the observatory; therefore it should be regarded as preliminary. Inquiries about this report or about the College Observatory should be addressed to: Chief, College Observatory, U.S. Geological Survey, Yukon Drive on West Ridge, Fairbanks, Alaska 99701.

Requests for copies of the magnetograms except for the current month should be addressed to: World Data Center A-NOAA, Environmental Data Service, Boulder, Colorado 80302.

OBSERVATORY LOCATION

The College Observatory, operated by the U. S. Geological Survey, is located at the University of Alaska, Fairbanks, Alaska. It is near the Auroral Zone and the northern limit of the world's greatest earthquake belt, the circum-Pacific seismic belt. Although the observatory's basic operation is in geomagnetism and seismology, it cooperates with other scientists and organizations in areas where the facility and personnel can be of service.

The observatory is one of three operated by the USGS in Alaska. The others are located at Barrow and Sitka.

The position of the observatory site is: Geographic latitude.....64°51.6'N, Geographic longitude.....147°50.2'W, Geomagnetic latitude.....+64.6°, Geomagnetic longitude.....+256.5°, Elevation.....200 meters.

GEOMAGNETIC DATA

Normal, Storm, and Rapid Run magnetograms and appropriate calibration data are processed daily at the observatory and are available for analysis or copying. Also available are mean hourly scalings, K-indices, selected magnetic phenomena reports, and in a real-time basis are recordings from a 3-component fluxgate magnetometer and F-component proton magnetometer.

Selected Phenomena & Outstanding Magnetic Effects

Prior to January 1, 1976, the Normal & Rapid Run records were reviewed at the observatory for selected magnetic phenomena and the events identified were forwarded to the IUGW Commission on Magnetic Variations and Disturbances. This was discontinued on January 1, 1976, but a report on Outstanding Magnetic Effects is prepared monthly for this report.

Magnetic Activity

The K-Index. The K-Index is a logarithmic measurement of the range of the most disturbed component (D or H) of the geomagnetic field for eight intervals beginning 0000-0300, 0300-0600...2100-2400 UT. It is a measure of the difference between the highest and lowest deviation from a smooth curve to be expected for a component on a magnetically quiet day, within a three hour interval.

The Equivalent Daily Amplitude, AK. The K-Index is converted into an equivalent range, ak, which is near the center of the limiting gamma ranges for a given K. The average of the eight values is called equivalent daily amplitude AK. The unit 10γ has been chosen so as not to give the illusion of an accuracy not justified.

The schedule for converting gamma range to K, and K to ak is as follows:

Gamma Range	K - Index	ak*
0 < 25	0	0
25 < 50	1	3
50 < 100	2	7
100 < 200	3	19
200 < 350	4	27
350 < 600	5	48
600 < 1000	6	80
1000 < 1650	7	140
1650 < 2500	8	240
2500+	9	400 (10γ)

Principal Magnetic Storms

Gradual and sudden commencement magnetic disturbances with at least one K-Index of 3 or greater, which are believed to be part of a world-wide disturbance, are classified as principal magnetic storms. The time of the storm beginning and ending; direction and amplitude of sudden commencements; period of maximum activity; and storm range are reported. Monthly reports of these data are forwarded to the World Data Center A in Boulder, Colorado.

Magnetogram Hourly Scalings

Magnetogram hourly scalings are averages for successive periods of one hour for the D, H, and Z elements. The value in the column headed "01" is the average for the hour beginning 0000 and ending 0100. Note that the values on the scaling sheets are in tenths of mm with the decimal point omitted. The user of these scalings should keep in mind that the tabular values are hourly means and if he is interested in the detailed morphology of the magnetic field, he should refer directly to the magnetograms.

Magnetograms

The normal magnetograms in this report are reproduced at about one-third the size of the originals. Preliminary base-line values and scale values adopted for use with the original magnetograms are included. For days when the magnetic field is too disturbed for the Normal magnetogram to be readable, Storm magnetograms are reproduced.

Absolutes, Base-lines, and Scale Values

To determine the absolute value of the magnetic field from the hourly means or from point scalings the following equations should be used:

$$D = B_D \cdot d \cdot S_D; H = B_H \cdot h \cdot S_H; Z = B_Z \cdot z \cdot S_Z$$

where D, H, and Z are absolute values; B_D, B_H and B_Z are base-line values; S_D, S_H and S_Z are scale values; and d, h, and z are scalings in millimeters.

The Magnetic Daily Character Figure, C. To each (normal) day a character is assigned on the basis of the K-index: C=0 if it is quiet; C=1 if it is moderately disturbed; C=2 if it is greatly disturbed. The assignment of characters at the College Observatory is based on AK as follows:

AK Range	C
0-11	0
12-50	1
50+	2

Assignment of C was discontinued at January 1, 1976.

MAGNETIC ACTIVITY
 (Greenwich civil time, counted from midnight to midnight)

DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS 20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			
1	1	1	2	0	0	1	1	2	08	03	SUDDEN COMMENCEMENTS d h m
2	3	4	3	6	6	1	2	3	28	30	
3	3	2	1	3	2	1	1	2	15	08	
4	1	1	2	3	2	1	0	0	10	05	
5	0	0	5	5	2	1	1	0	14	14	
6	1	1	0	4	5	5	5	3	24	24	
7	3	2	1	5	5	4	3	3	26	22	
8	3	2	3	2	5	6	5	3	29	29	
9	3	3	4	6	6	6	3	3	34	41	
10	2	2	2	5	6	4	1	2	24	23	
11	3	3	3	4	6	4	1	2	26	24	
12	1	1	1	3	3	1	1	0	11	06	
13	1	1	3	2	2	1	3	2	15	08	
14	2	2	2	2	5	4	2	1	20	14	
15	1	1	1	2	2	3	2	1	13	06	
16	2	2	2	1	1	1	0	0	09	04	
17	1	1	1	2	3	3	3	1	15	08	
18	3	5	2	2	3	2	2	1	20	14	
19	3	1	1	1	3	3	2	1	15	08	
20	1	1	1	2	2	1	1	2	11	05	
21	1	1	1	0	4	3	1	0	11	07	
22	0	0	0	0	3	4	2	2	11	07	
23	1	2	3	5	6	5	3	2	27	28	
24	2	1	2	3	5	3	5	3	24	20	
25	2	2	2	2	3	3	2	2	18	09	
26	2	1	0	3	2	2	0	0	10	05	
27	0	0	1	1	0	0	0	0	02	01	
28	2	1	3	3	0	0	1	1	11	06	
29											POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
30											
31											

USED: LIMIT FOR K = 9..... SCALE VALUE..... LIMIT FOR K = 9..... AND COMPUTATIONS HAVE BEEN CHECKED.	D	H	Z	
	683.8	321.7		(mm)
	3.76	7.82		(γ/mm)
	2570	2520		(to nearest 10γ)

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY
COLLEGE, ALASKA

MONTH FEBRUARY	YEAR 1977
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DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS
01	18XX	pc5	
04	00XX	pc4	
04	12XX	pi2	With Bay
04	20XX	pc3	
12	09XX	pi2	With Bay
17	00XX	pcl	
18	04XX	b	Positive bay in H
19	02XX	pc5	With pcl's
20	13XX	pi2	With Bay
26	13XX	pc4	

REPIED BY: MJM/JEP

VERIFIED BY: JBT

NATURE OF PHENOMENON: ssc, ssc*, si, si*, b, bp, bs, bps, pcl, pc2 - - - pc5, pg, pi 1, pi 2, sfe.

WDC-A FOR SOLAR-TERRRESTRIAL PATRICK
 ENVIRONMENTAL DATA SERVICE, NOAA
 BOULDER, COLORADO 80303 U.S.A.

PRINCIPAL MAGNETIC STORMS
 COLLEGE OBSERVATORY, COLLEGE, ALASKA
 FEBRUARY 1977

Principal Observatories:

Station	lat.	Commencement		SC - amplitudes			Max. 3 hr - index K		Ranges			UT End day hr		
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')		H(Y)	Z(Y)
CO	64° 6' N	06	0940	s.c.*	-3	+9	+6	08 09	6 4,5,6	6 6	161	1120	690	09 23

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
				BASELINE	
D	0000 U.T., 2-1-77	2400 U.T., 2-28-77	1.0/mm	3.8 x/mm	28° 06.9 E
H	0000 U.T., 2-1-77	2400 U.T., 2-28-77	7.8 x/mm		12748 x
Z	0000 U.T., 2-1-77	2400 U.T., 2-28-77	7.7 x/mm		55138 x

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
				BASELINE	
D	0000 U.T., 2-1-77	2400 U.T., 2-28-77	7.9/mm	29.8 x/mm	24° 24.1 E
H	0000 U.T., 2-1-77	2400 U.T., 2-28-77	44.1 x/mm		11488 x
Z	0000 U.T., 2-1-77	2400 U.T., 2-28-77	48.9 x/mm		54010 x

RAPID RUN MAGNETOGRAPHS					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D	0000 U.T., 2-1-77	2400 U.T., 2-28-77	0.3/mm		1.0 x/mm
H	0000 U.T., 2-1-77	2400 U.T., 2-28-77	1.0 x/mm		
Z	0000 U.T., 2-1-77	2400 U.T., 2-28-77	2.4 x/mm		

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
28° 20.2 E	13050 x	55364 x

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

PERIOD: FEB 1, 4, 12, 15, 16, 20, 22, 26, 27, 28

Form CGS-10a
10-57

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICE ADMINISTRATION
COAST AND GEODESIC SURVEY
GEOMAGNETISM DIVISION

OBSY. YEAR MONTH ELEMENT
CO 77 JAN R

Values are in units of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (150W M.T.) is hour 11 of the same universal day.
Chicago corrections have been applied. Negative values are in red, with minus signs shown.

C	Loc	Sec	Mag	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM		
			01	391	396	402	396	392	410	436	414	403	392	384	381	01	381	383	383	375	389	392	386	384	381	382	383	339	9355	
			02	335	382	422	432	540	441	485	549	446	423	215*	290	02	255*	174	320	401	401	395	383	372	376	378	372	303	8090	
			03	345	398	411	403	407	405	396	389	400	413	424	362	03	399	393	388	393	386	382	384	379	378	382	381	375	9367	
			04	389	391	402	405	403	393	393	395	398	404	398	388	04	387	361	373	411	396	394	391	389	391	395	396	396	9439	
			05	393	394	401	403	402	402	403	430	380	390	435	404	05	376	392	396	389	391	387	382	379	379	381	385	391	9465	
			06	383	388	389	398	394	389	393	397	393	399	451	361	06	249	83	49	304	238	190	45	98	325	394	422	387	7525	
			07	382	433	436	444	440	413	444	398	399	412	318	201	07	361	177	306	376	326	364	322	311	359	352	379	415	8755	
			08	383	426	454	398	389	413	392	441	411	425	388	419	08	396	332	191	-217*	121	95	171	141	373	357	358	383	7574	
			09	419	442	456	460	451	446	477	479	417	379	174*	-109*	09	271	-86*	-515*	-1*	154	387	417	387	286	340	380	367	6878	
			10	374	379	410	411	404	406	429	449	459	397	372	97	10	55	-205*	176	378	410	391	381	374	372	366	334	350	7973	
			11	374	377	413	410	401	439	503	469	462	497	428	373	11	190	-306*	-260*	289	322	426	390	391	383	378	373	379	8161	
			12	373	386	386	394	405	398	399	400	403	410	386	353	12	347	407	403	387	390	392	389	380	370	376	386	391	9311	
			13	389	381	379	401	413	411	399	439	449	436	400	400	13	366	366	383	381	383	380	291	360	387	357	369	364	9304	
			14	391	390	408	393	430	450	432	410	393	390	389	380	14	229	-36	157	304	352	357	370	366	344	353	360	381	8373	
			15	376	384	407	406	418	416	407	404	409	407	400	403	15	408	386	360	340	348	394	387	371	351	380	374	370	9306	
			16	379	410	383	392	418	419	453	474	410	400	397	389	16	379	374	370	374	373	381	385	386	378	378	380	389	9471	
			17	387	361	363	381	389	391	399	404	420	418	419	401	17	407	455	386	377	363	307	299	381	380	362	387	382	9239	
			18	407	402	436	437	706	513	396	421	403	392	391	379	18	369	364	340	366	341	363	390	381	382	376	381	384	9720	
			19	391	394	390	397	396	391	394	390	391	398	406	403	19	399	378	284	301	338	362	377	369	370	374	379	383	9055	
			20	390	398	400	401	394	395	390	384	400	387	359	380	20	400	359	367	401	399	391	369	380	379	376	378	376	9273	
			21	386	387	392	397	398	397	400	394	386	389	396	398	21	369	146	287	369	311	381	403	365	373	364	366	373	8647	
			22	379	386	390	381	379	389	382	380	388	386	385	384	22	373	263	208	266	356	379	362	326	349	380	378	376	8615	
			23	384	389	382	400	400	392	404	429	516	470	299	262	23	16	25	385	357	204	201	343	390	377	371	361	383	8146	
			24	384	383	390	387	386	389	389	396	439	476	469	399	24	72	-29	217	426	365	371	168	151	383	384	386	379	8160	
			25	383	265	370	410	390	389	407	404	418	406	381	389	25	294	206	319	317	366	379	390	376	364	340	356	331	8750	
			26	357	374	396	401	396	394	389	387	389	389	336	366	26	380	364	367	364	357	365	391	380	370	376	379	380	9037	
			27	377	376	380	380	381	385	390	388	384	397	383	389	27	386	386	381	384	380	388	387	390	387	380	377	376	9212	
			28	353	373	383	394	393	419	434	449	533	479	423	396	28	389	383	388	390	388	386	381	379	376	373	381	371	9614	
			29													29														
			30													30														
			31													31														

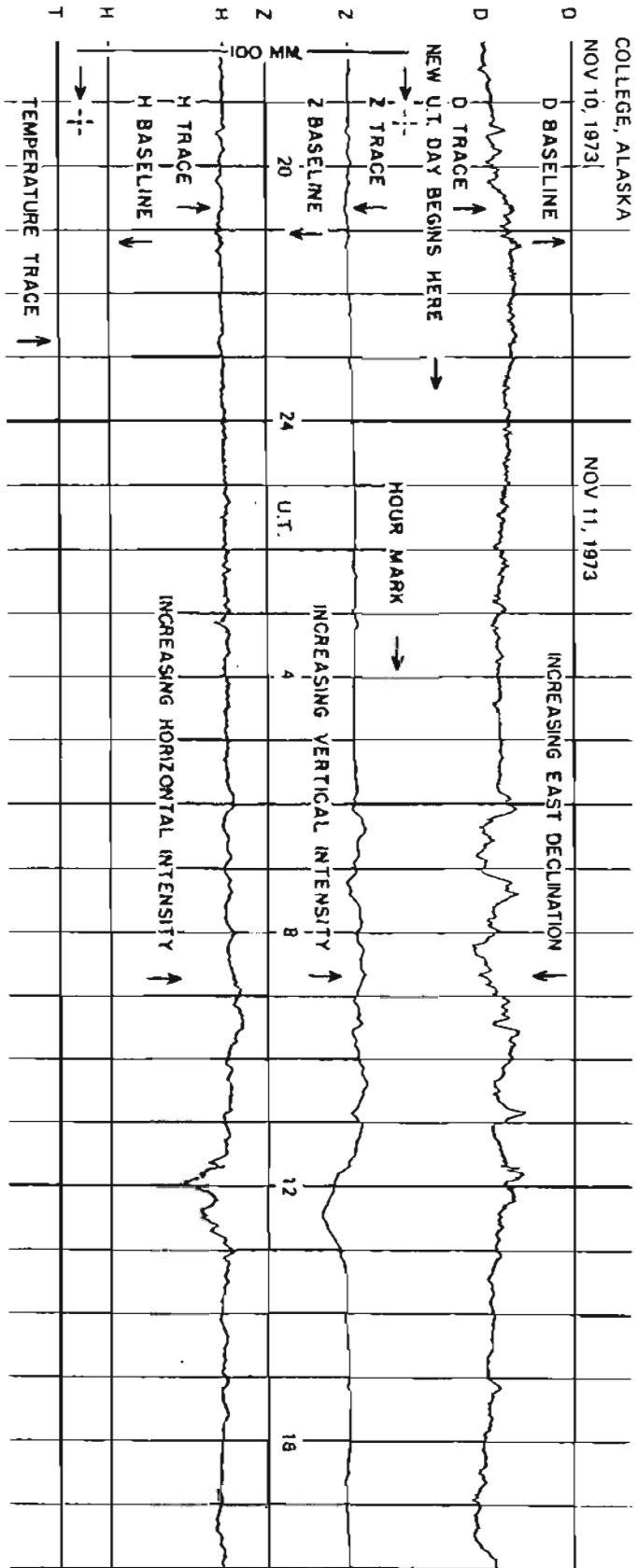
SCALED BY: SPT
CHECKED BY: JEP, MJM
SIGNS REVIEWED BY: JEP
PUNCHED BY:

Preliminary base-line and scale values:
Interval Beginning Base-line Value Scale Value

() Interpolated
() Significant portion of hour interpolated.
 No record, or no values available because of faulty record.
* Derived from STORM 12ph, converted to Normal 12ph.

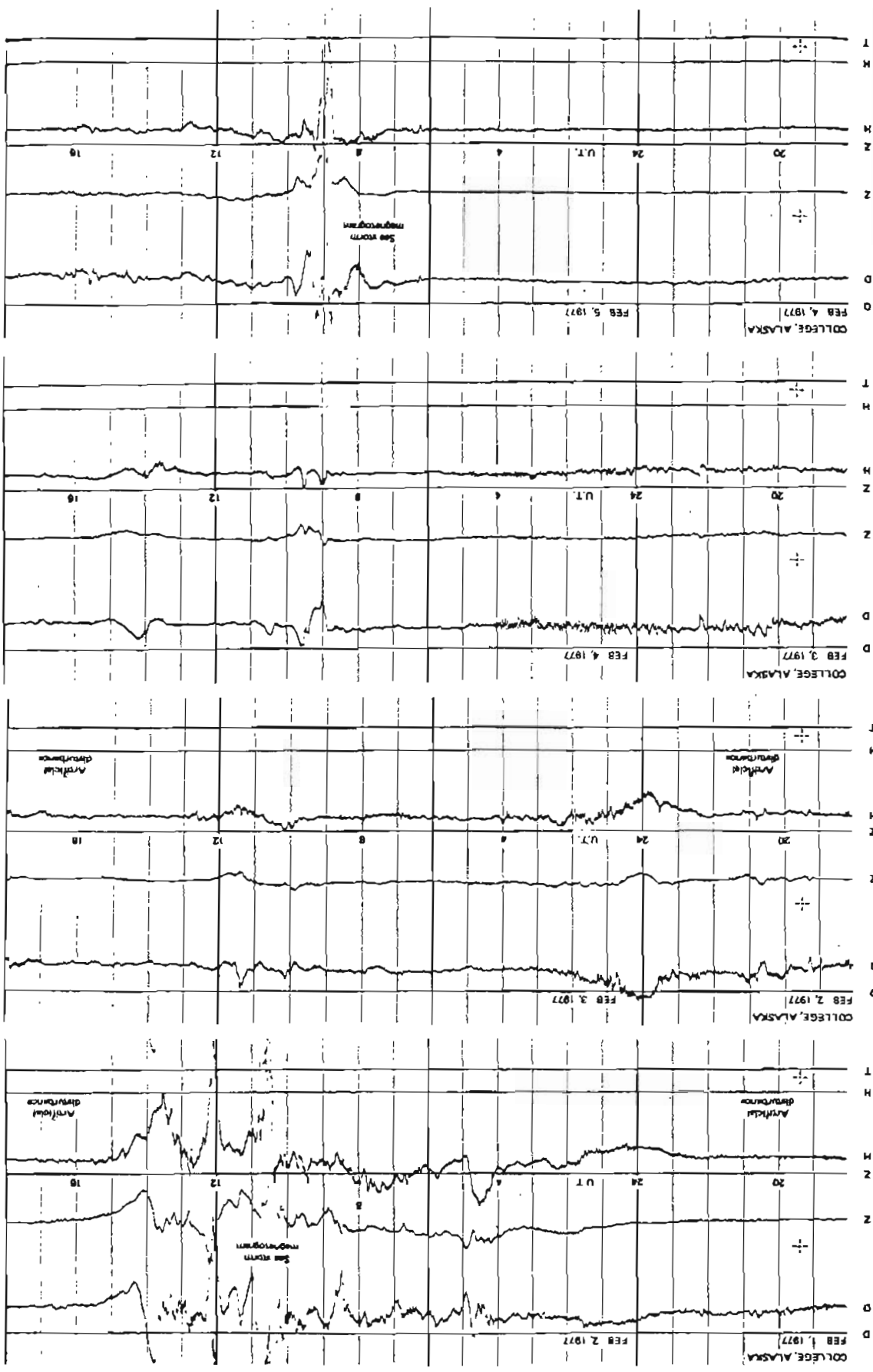
MONTHLY SUM: 247015
MONTHLY MEAN: 368
DATE WITH GAPS:
Scaling uncertain because of magnetic storm.
<> Record off sheet for part of all of hour; if value is given, curve was estimated for missing part.

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



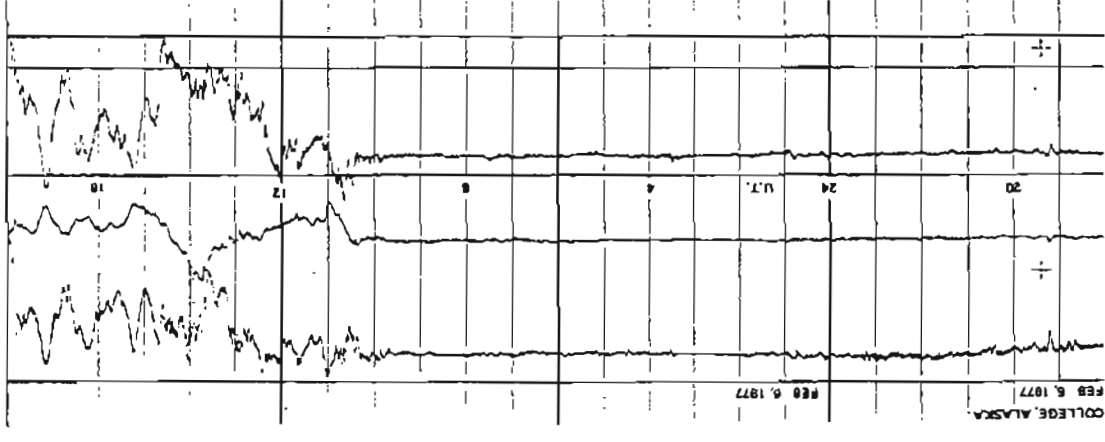
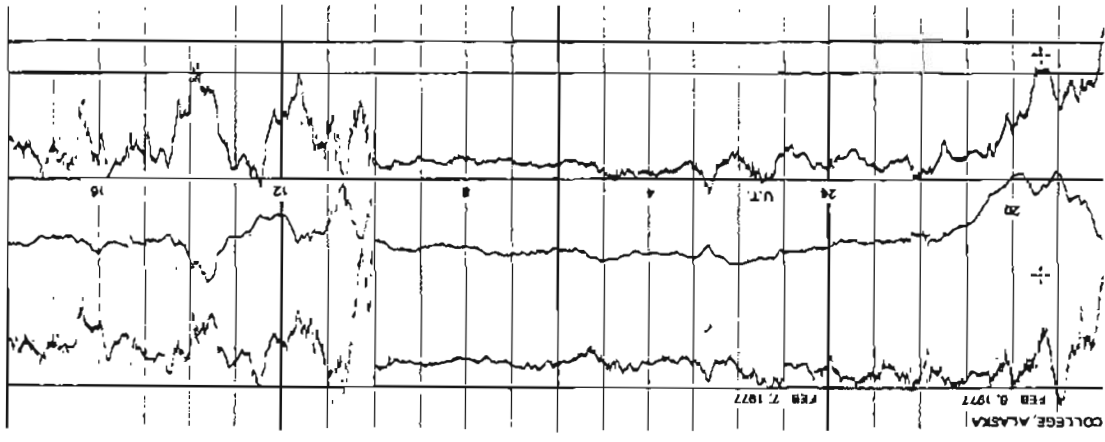
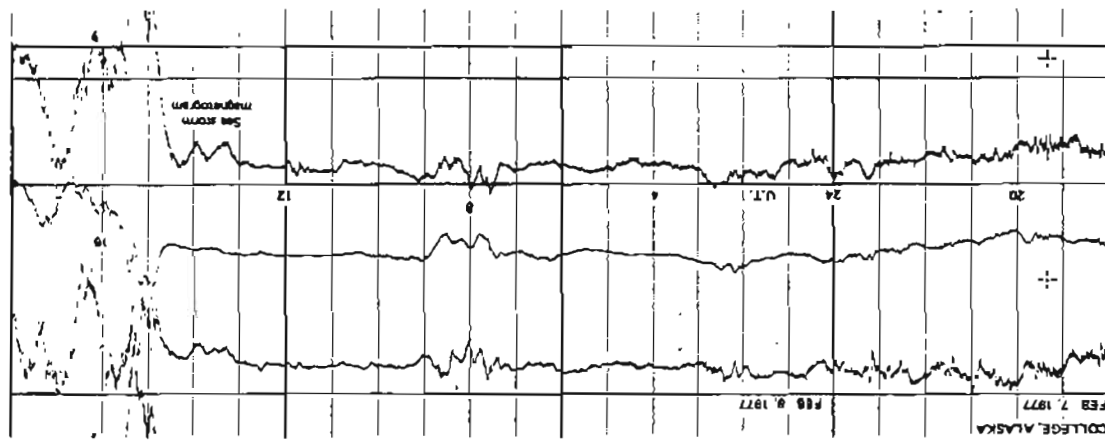
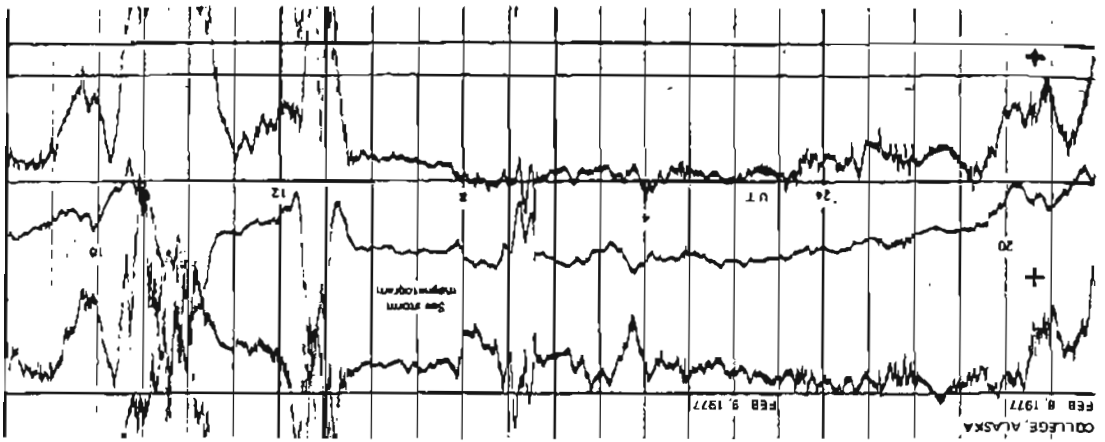
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

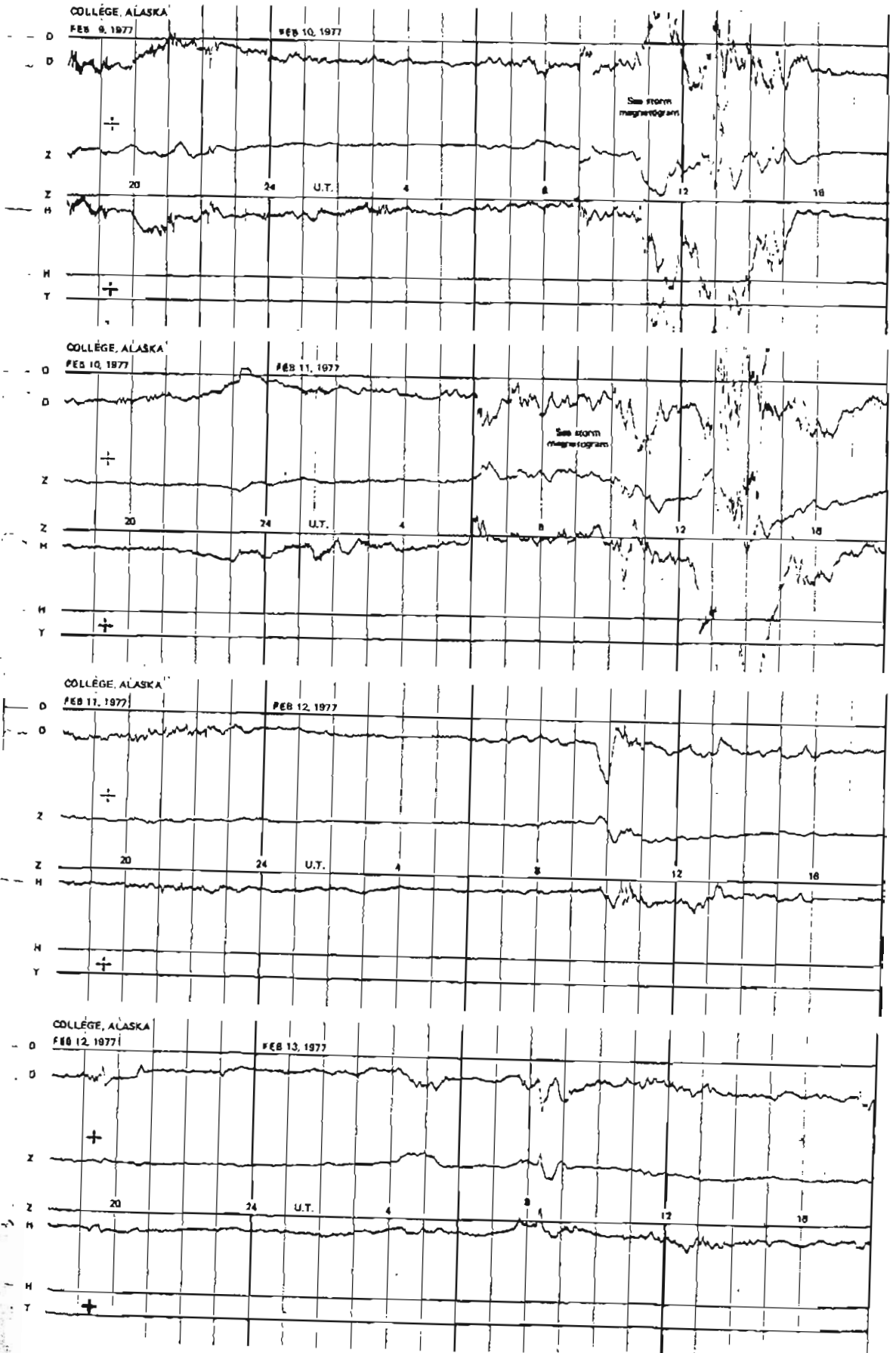


NORMAL MAGNETOGRAMS

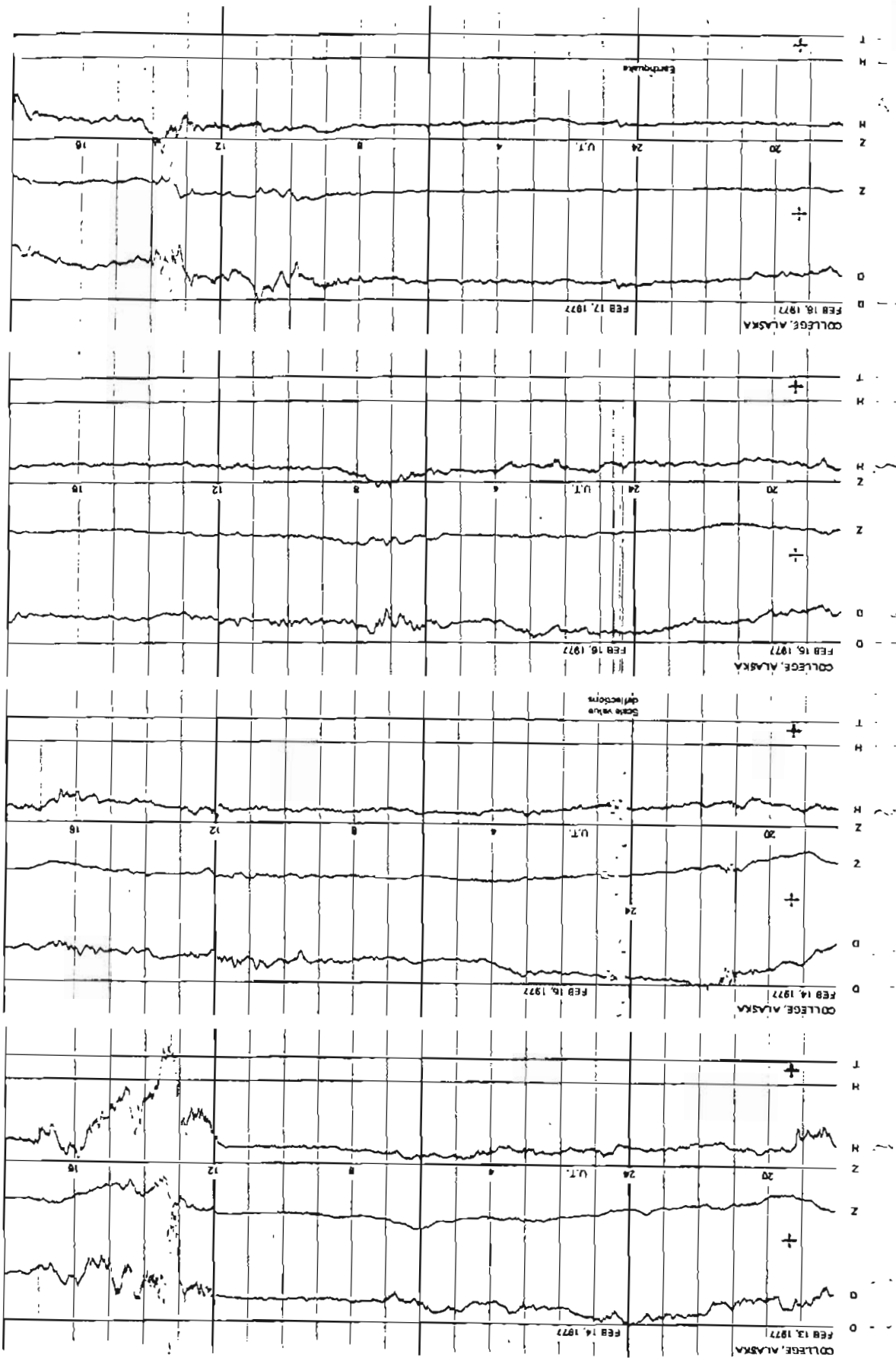
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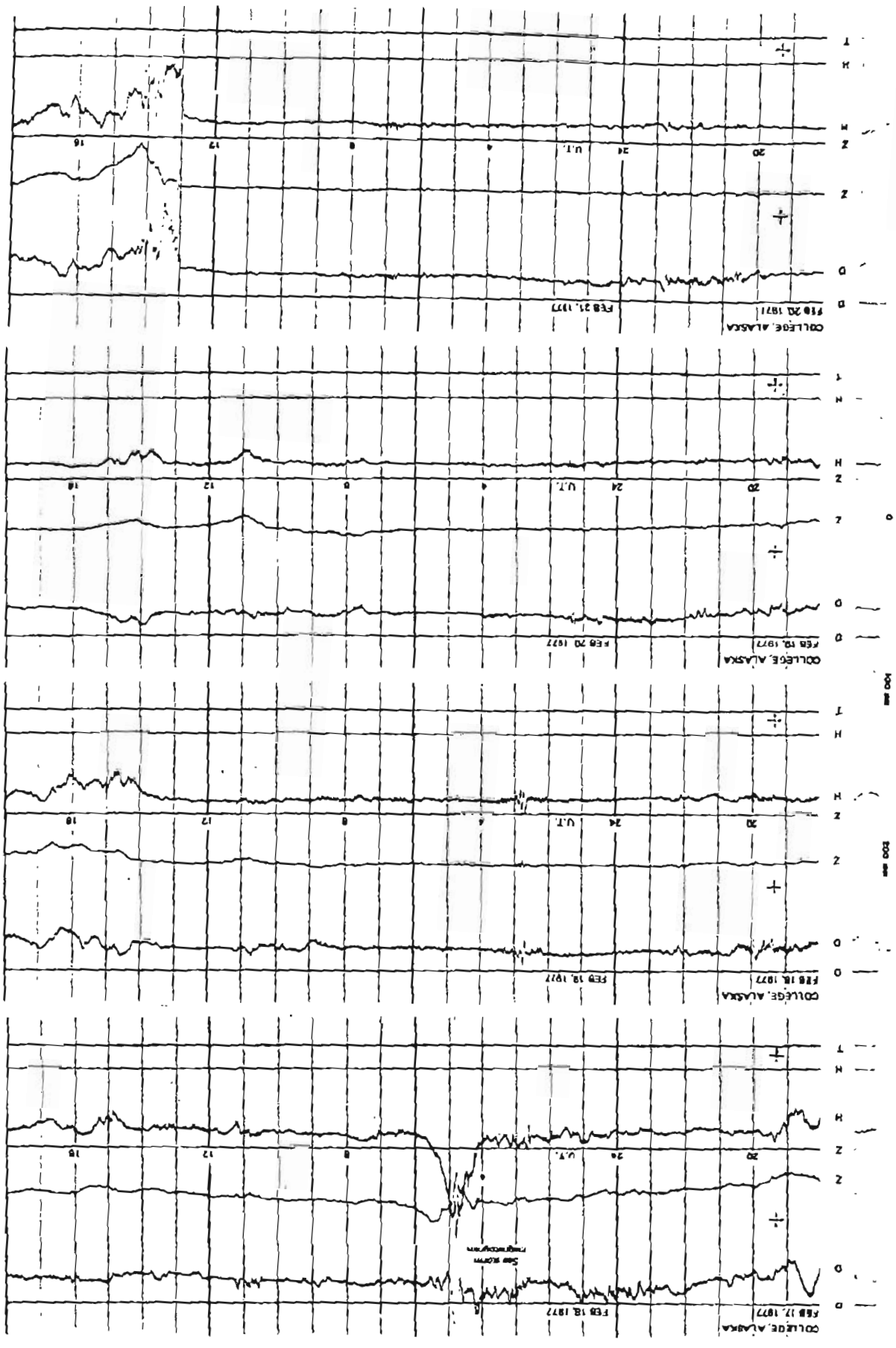
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

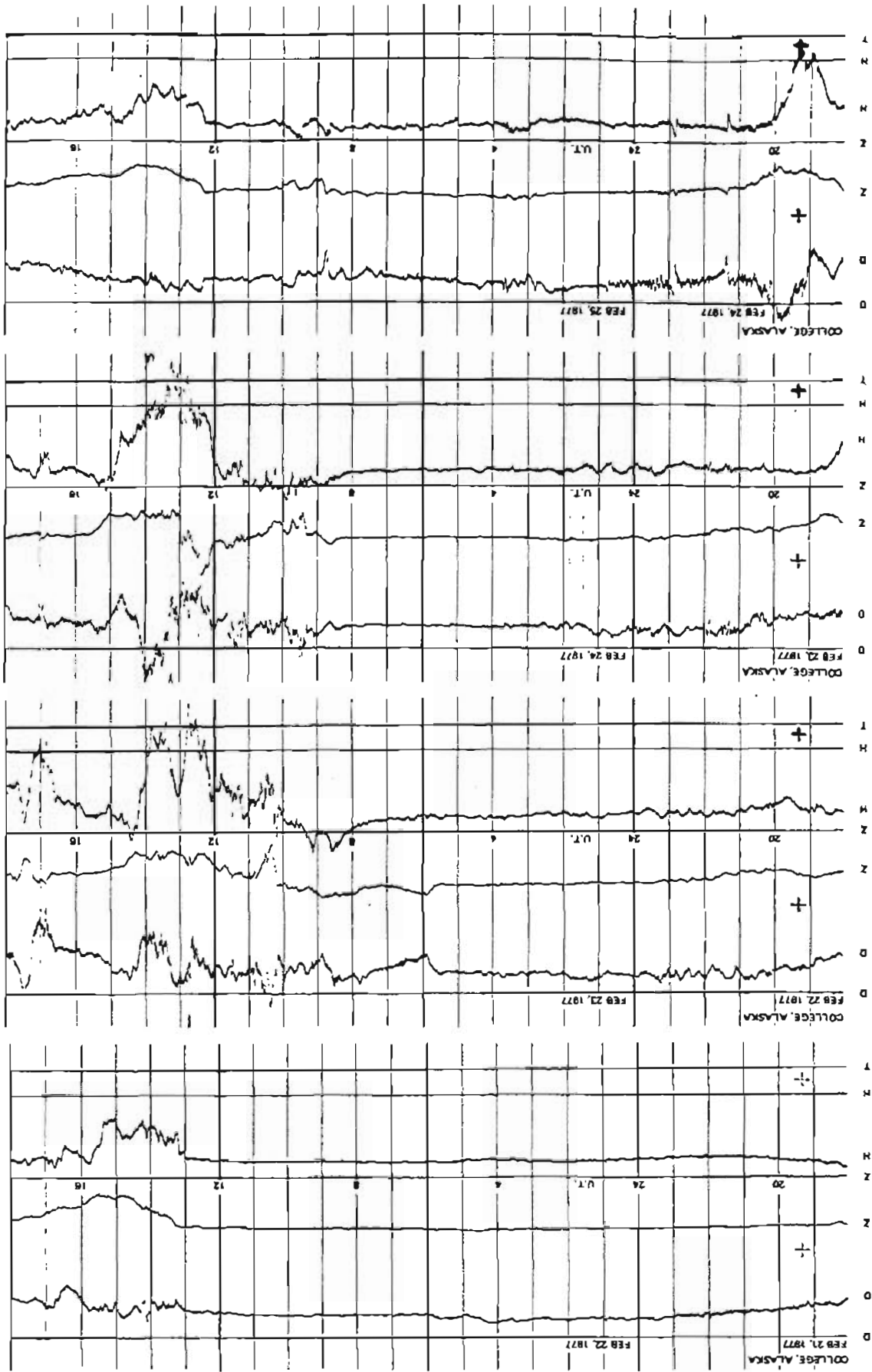


NORMAL MAGNETOGRAMS

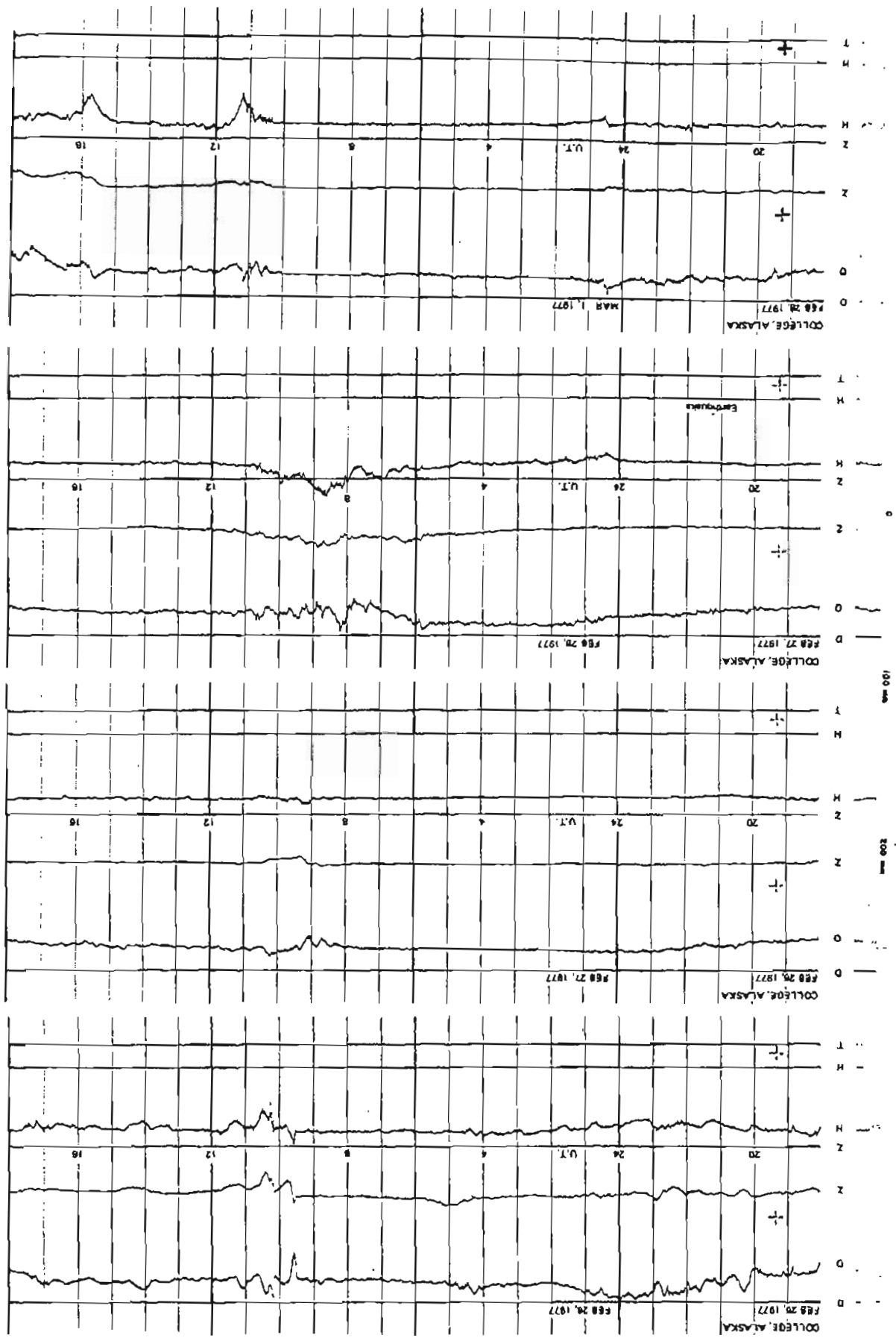


NORMAL MAGNETOGRAMS

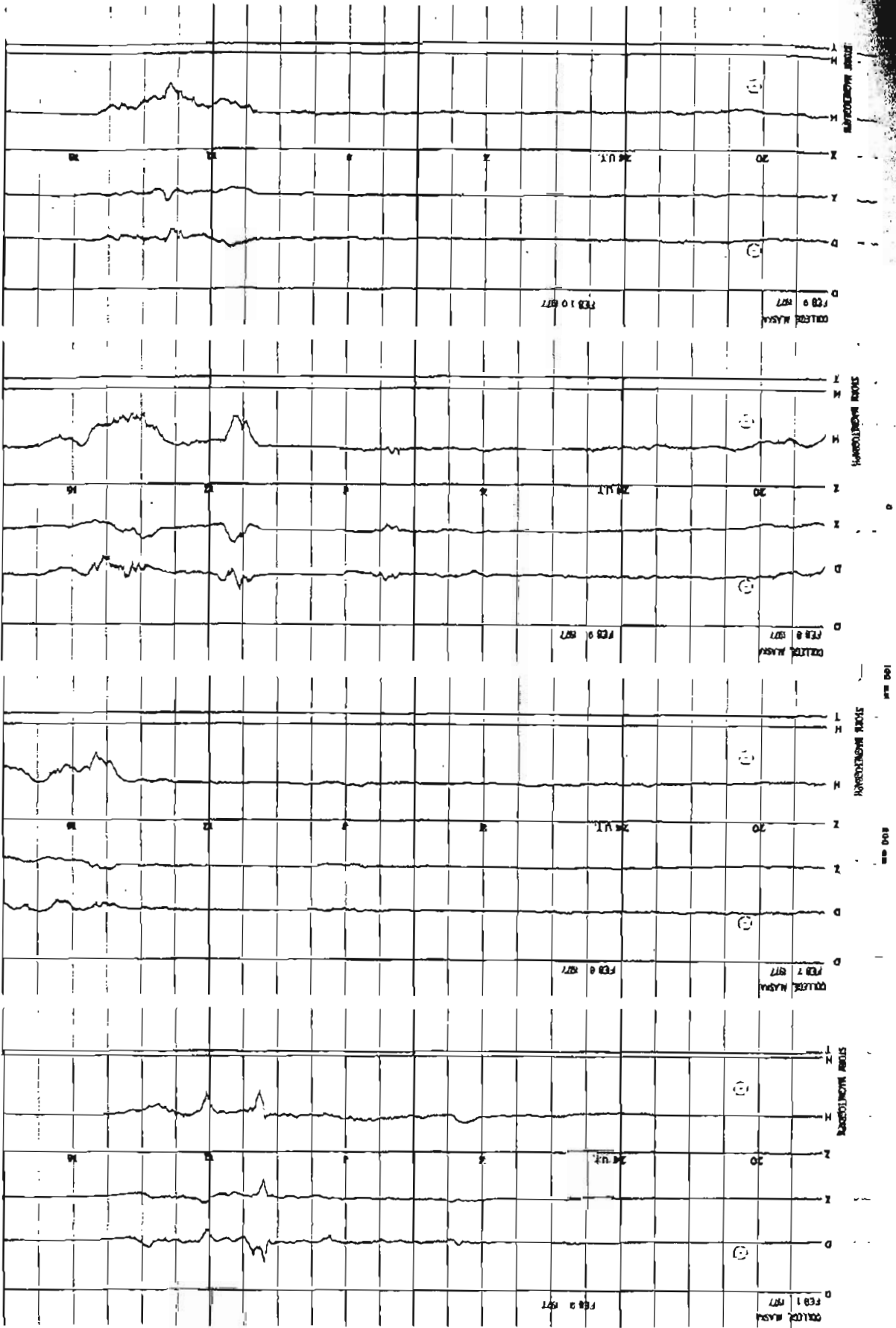
100 mV
200 mV



NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

