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Infrared Solar Spectrum Observed from a Balloon-Borne Spectrometer
Between 9300 and 11000 Å and Between 12000 and 19000 Å

Aharon Goldman, David G. Murcray,
Frank H. Murcray, and Walter J. Williams

Department of Physics, University of Denver, Denver, Colorado 80210

Contract: F19628-68-C-0233

Project No. 8662

SCIENTIFIC REPORT No. 8

15 JANUARY 1972

This research was sponsored by the Advanced Research Projects Agency
under ARPA Order No. 363

Contract Monitor: Robert McClatchey
Optical Physics Laboratory

Prepared for
Air Force Cambridge Research Laboratories
Office of Aerospace Research
United States Air Force
Bedford, Massachusetts 01730

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KEY WORDS

LINK A

LINK B

LINK C

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Solar Spectrum

Infrared Spectrum

Atomic Lines

ic

AFCRL-73-0349

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ABSTRACT

Records are presented of the infrared solar spectrum in the 0.9 - 1.1 μ and 1.2 - 1.9 μ regions, observed from altitudes up to 30 km, with a resolution of 0.5 \AA . The spectra show many new solar absorption lines which appear only at high altitude records, where the telluric absorptions are eliminated.

SUMMARY

This report completes the presentation of the results obtained during the balloon flight performed August 7, 1967. The flight details were described in a separate report.⁽¹⁾ During this flight, high altitude atmospheric transmittance data was obtained, using the sun as the source. The spectral region scanned was from 1 to 2 μ , with a resolution of $\sim 0.5\overset{\circ}{\text{A}}$.

Partial results from this flight were presented in previous publications, which included a few representative lines in the 1-2 μ region⁽²⁾ and the complete data obtained in the 1.1 μ region⁽³⁻⁴⁾ (10800 - 12150 $\overset{\circ}{\text{A}}$). The present report completes the data in the 1-2 μ region. The results are presented in the form of an atlas, following similar procedures to those described in Ref. 2-3. The Michigan atlas,⁽⁵⁻⁶⁾ the Arizona-NASA atlas,⁽⁷⁻⁸⁾ the Jungfraujoeh atlas⁽⁹⁻¹⁰⁾ and recently calculated line intensities and positions⁽⁴⁾ were used for line identifications.

ACKNOWLEDGMENTS

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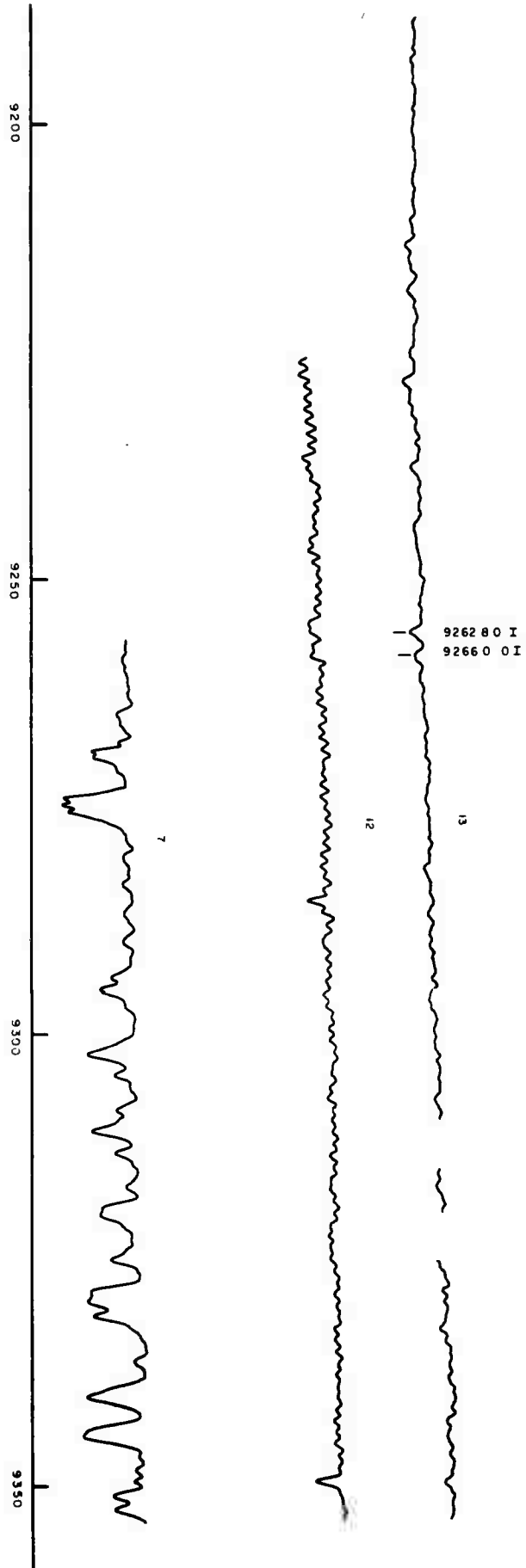
Our thanks to Charles Garwood, Steve Smith and John Van Allen for valuable assistance on the data reduction.

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4
FIG 1 SEC 1

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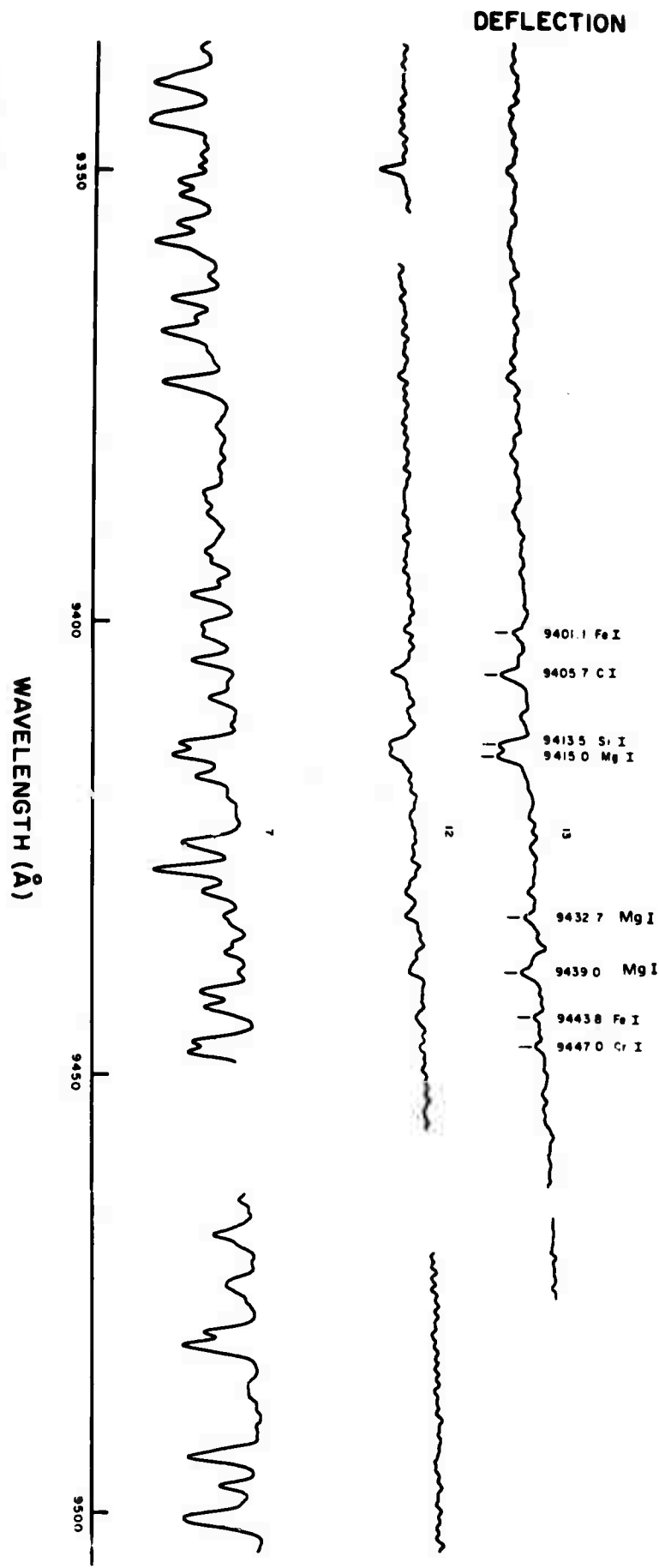


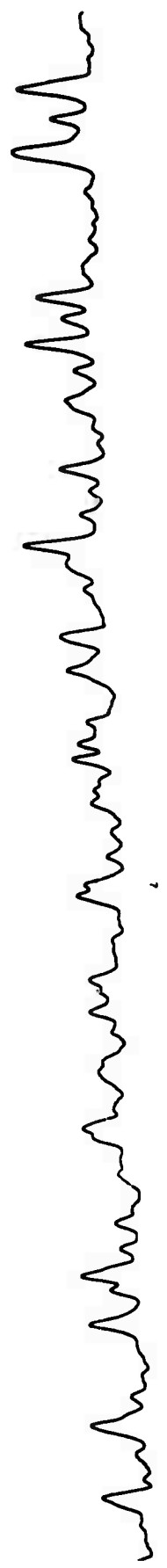
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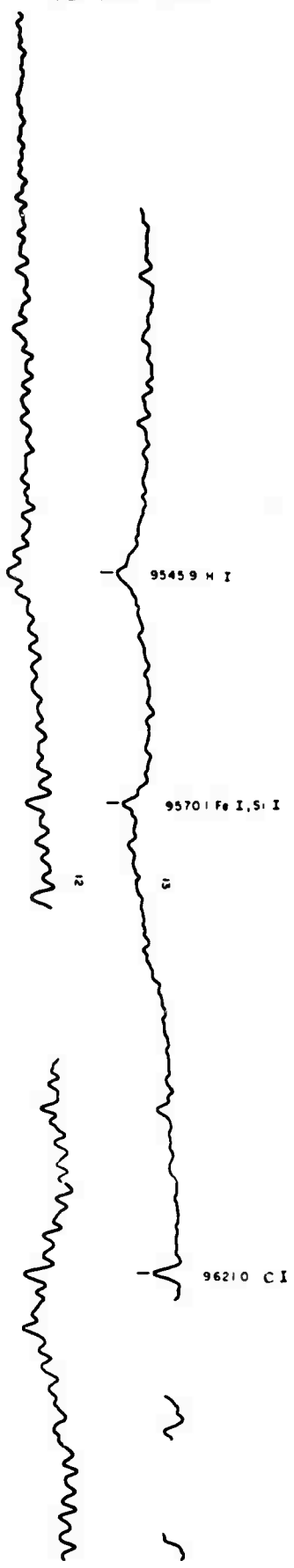
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FIG 1 SEC 3

WAVELENGTH (Å)



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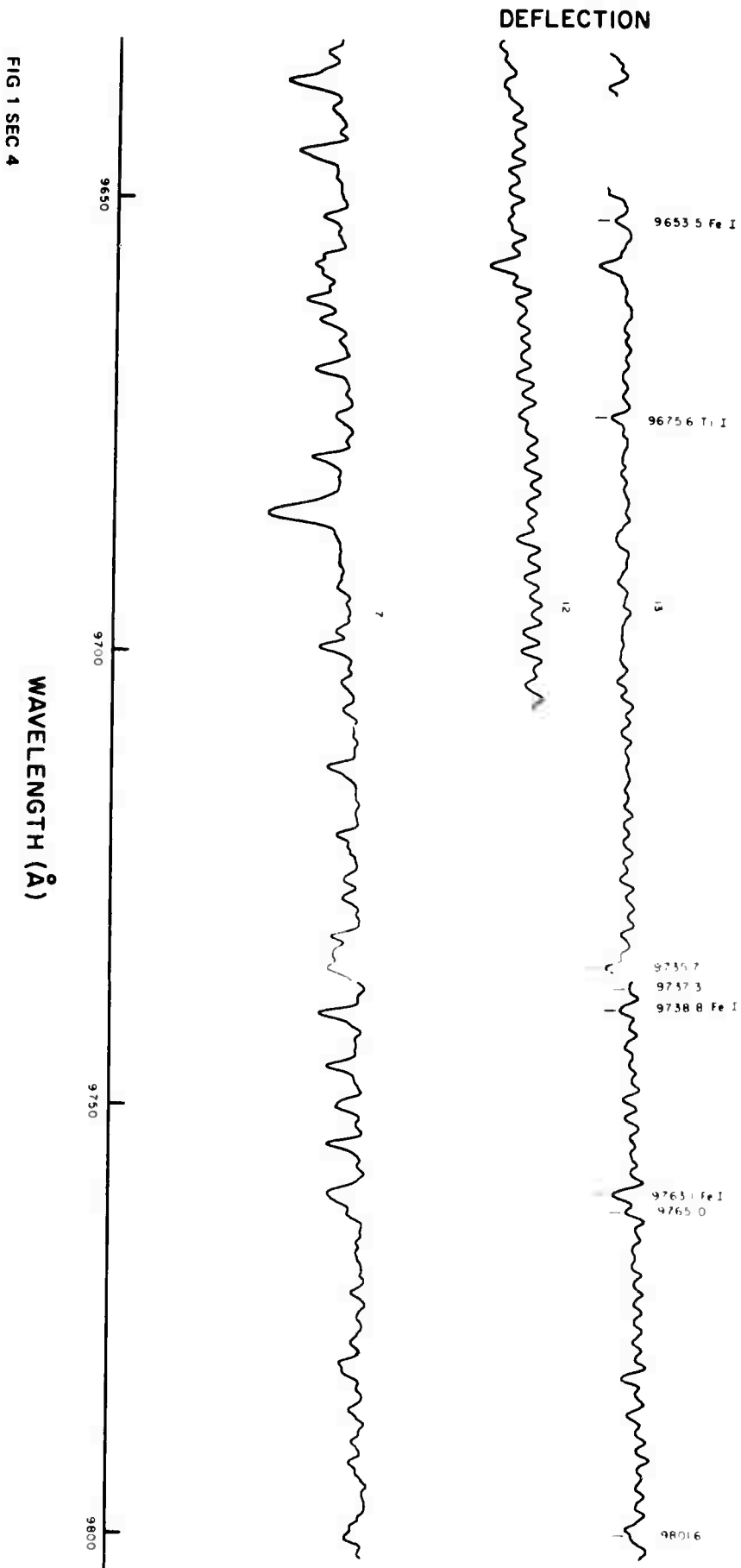


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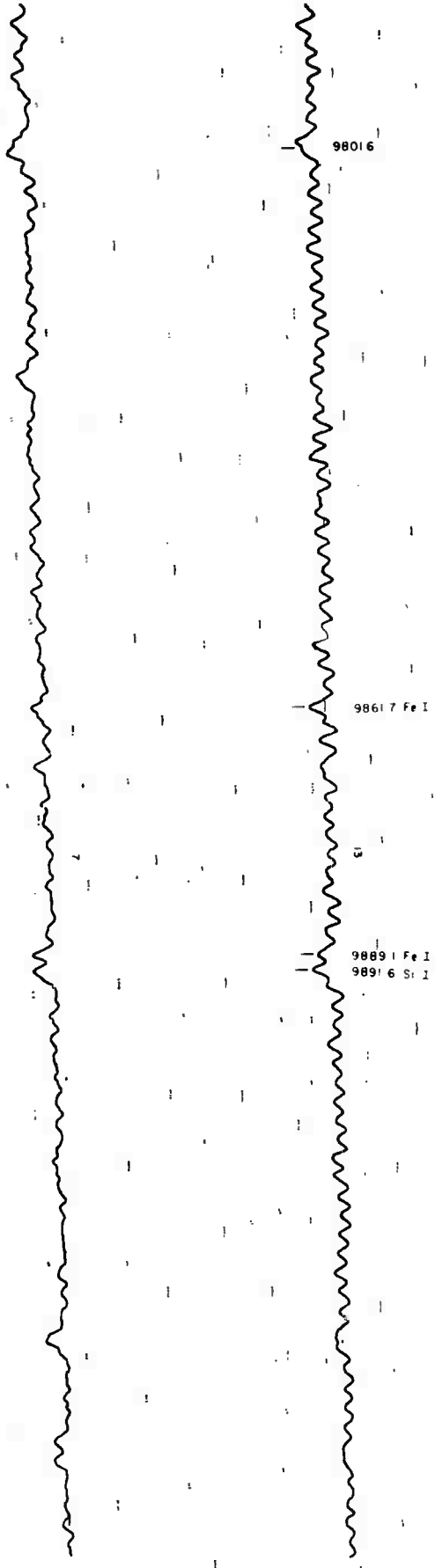
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FIG 1 SEC 5

WAVELENGTH (Å)



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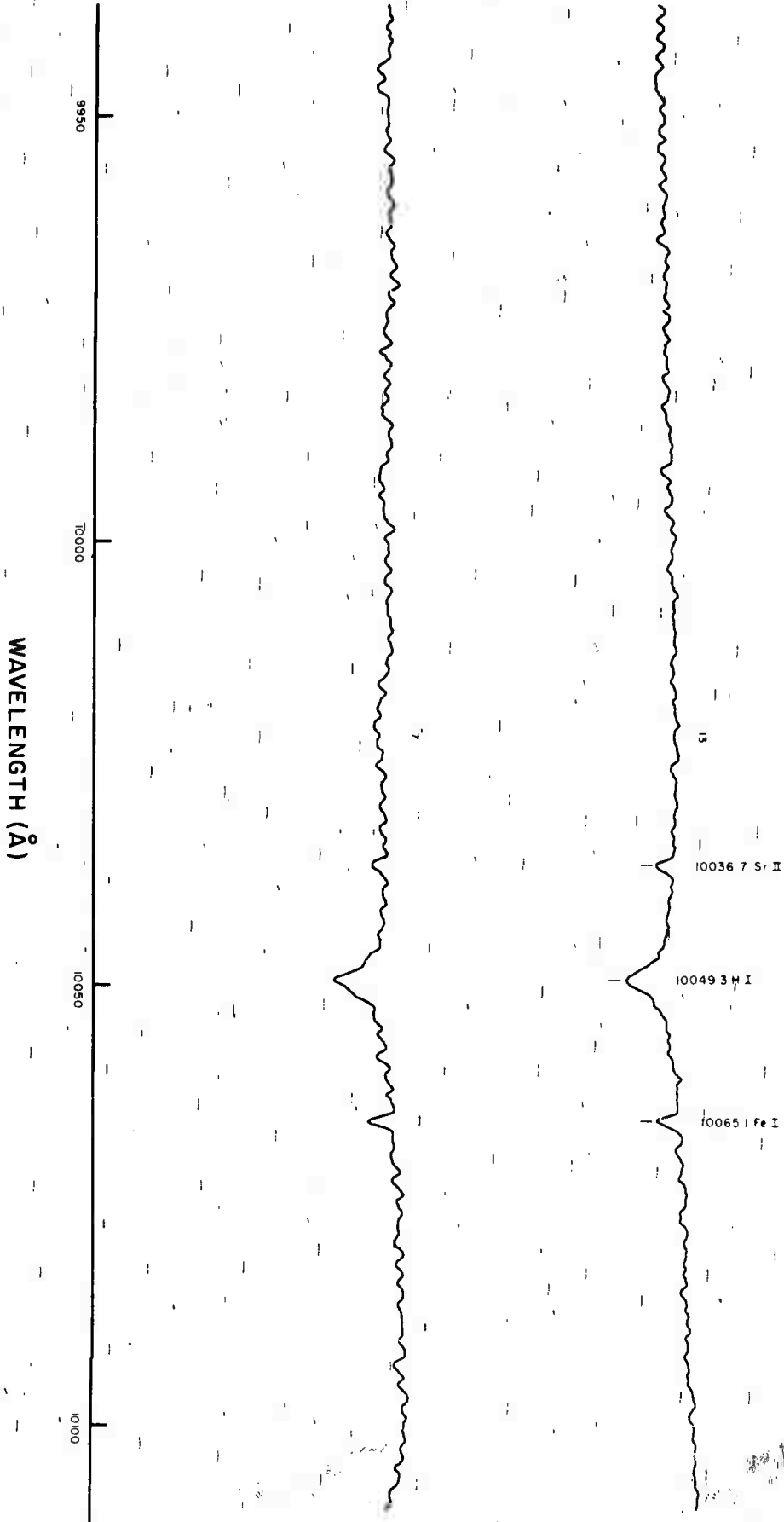


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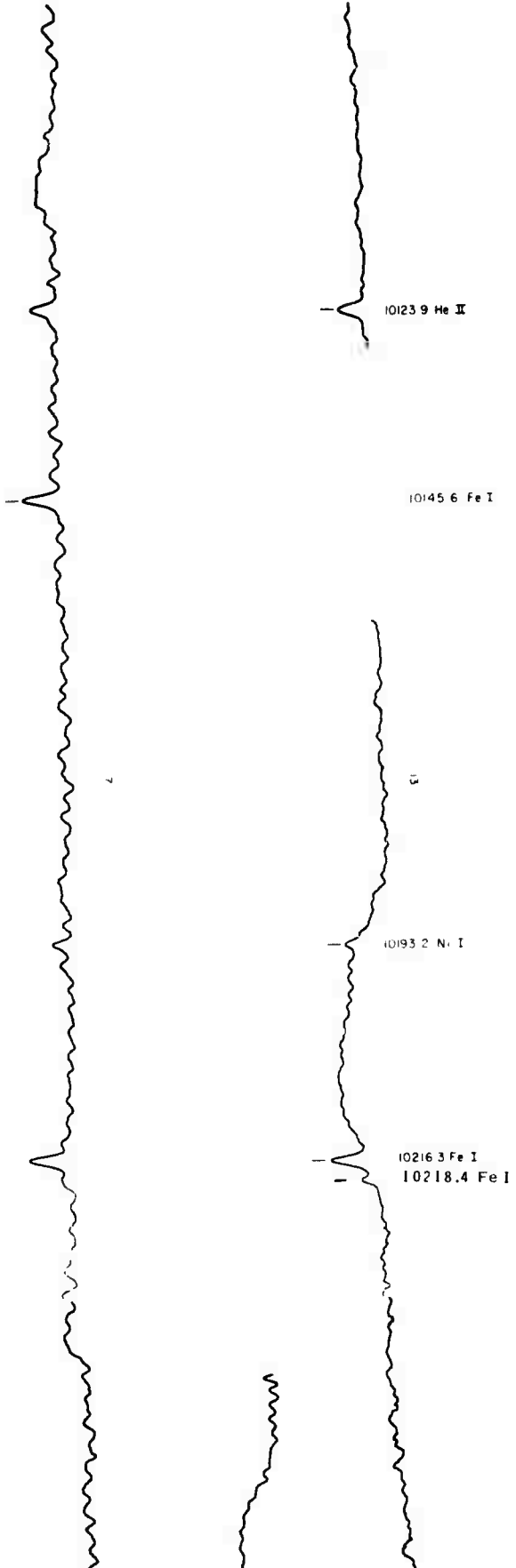
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FIG 1 SEC 7

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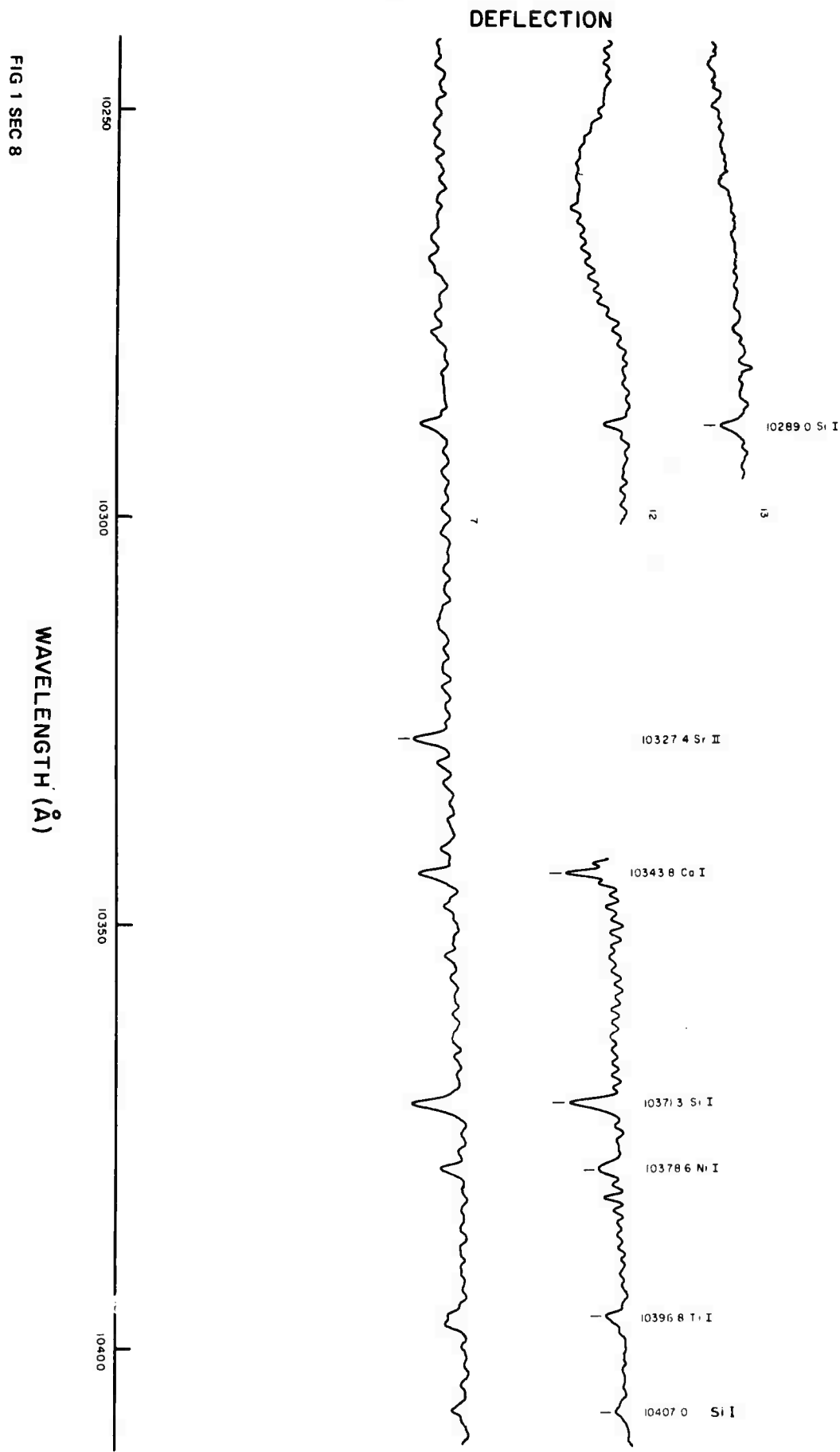


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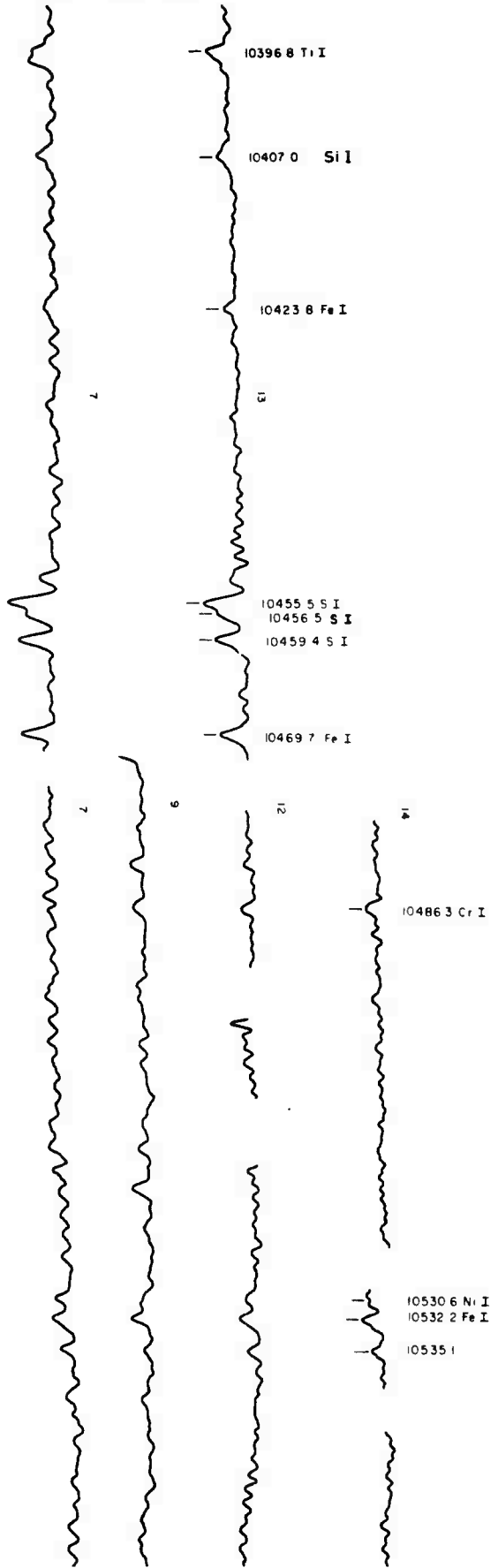
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FIG 1 SEC 9

WAVELENGTH (Å)



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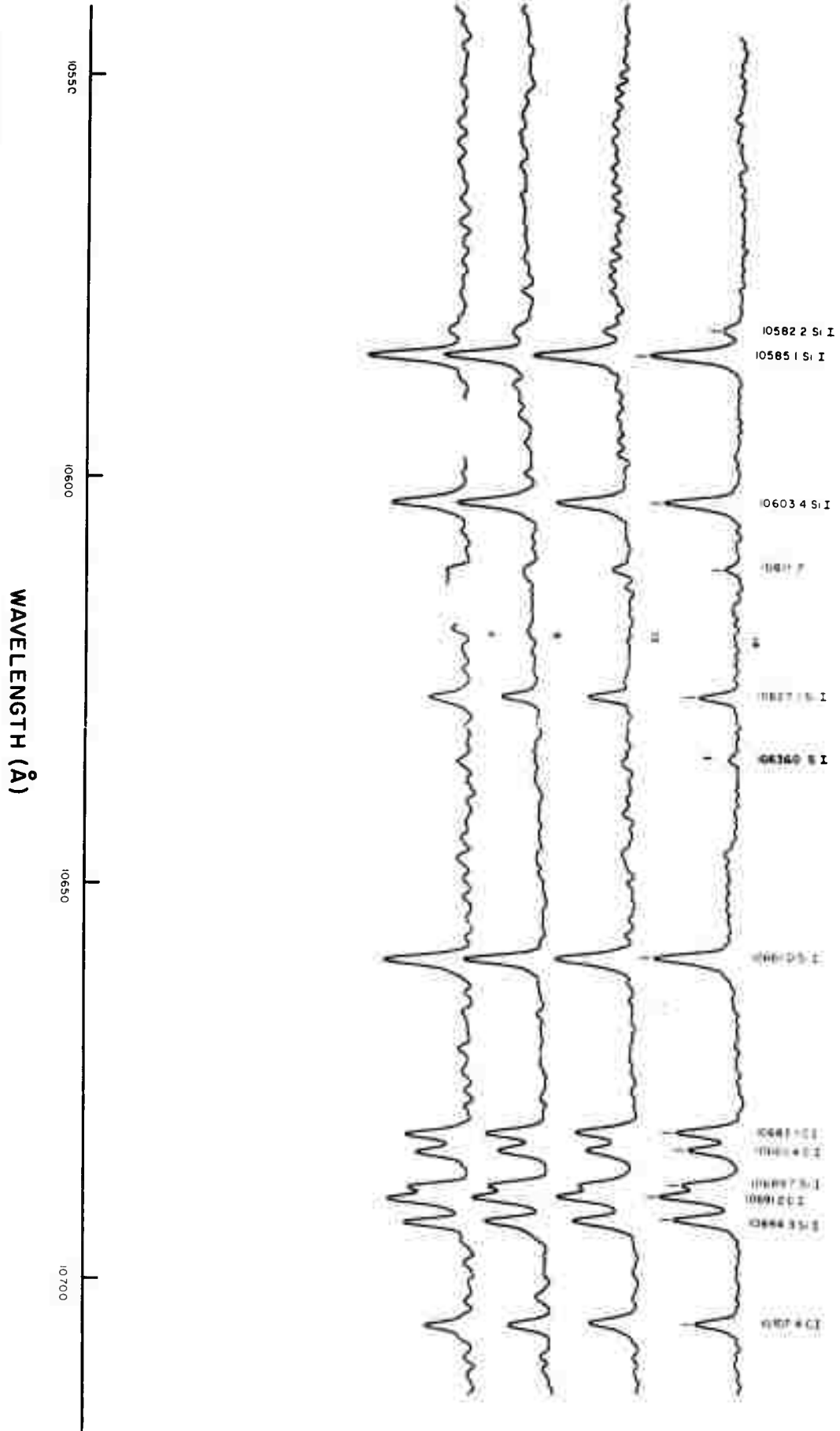


FIG 1 SEC 10

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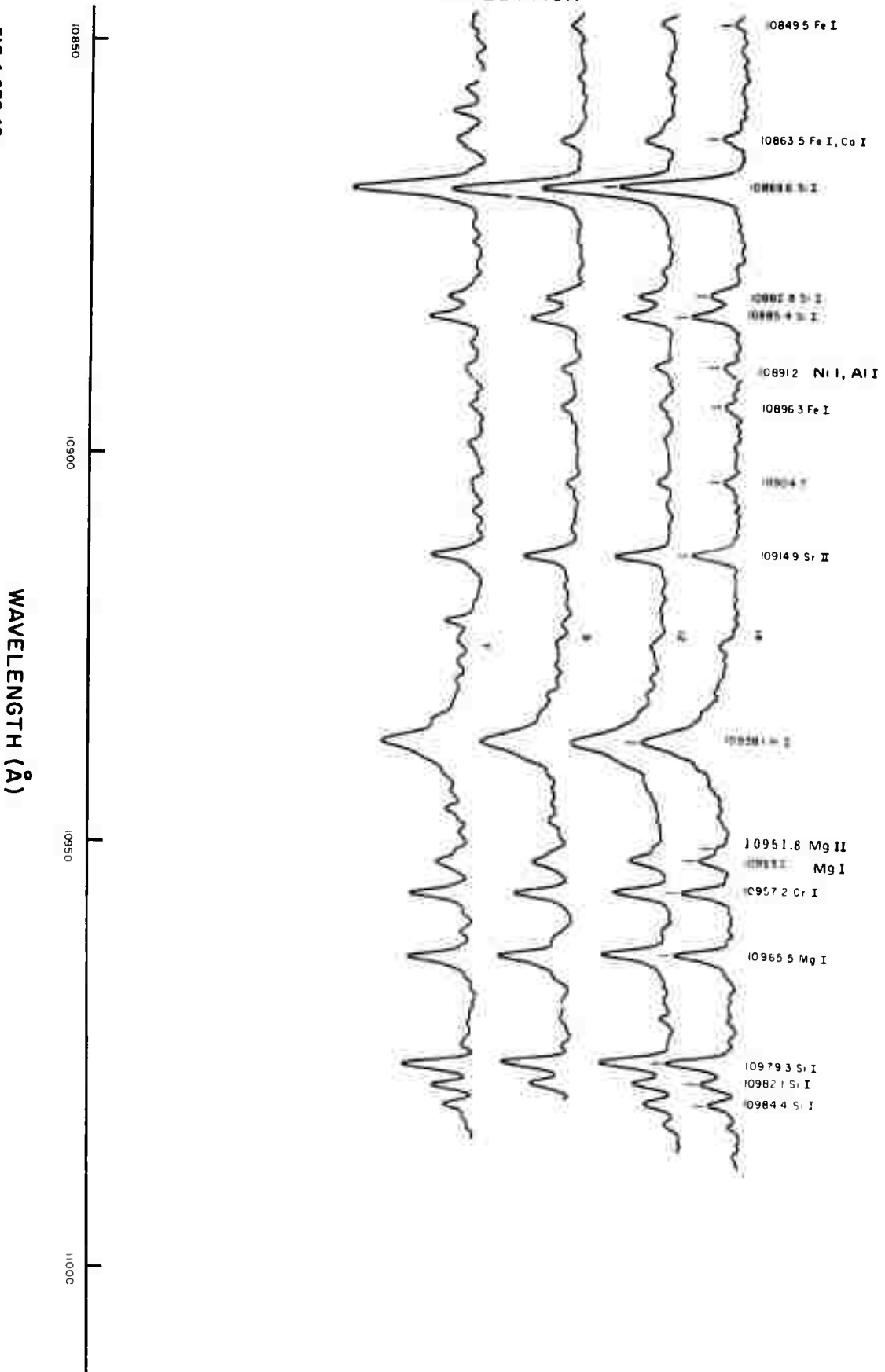


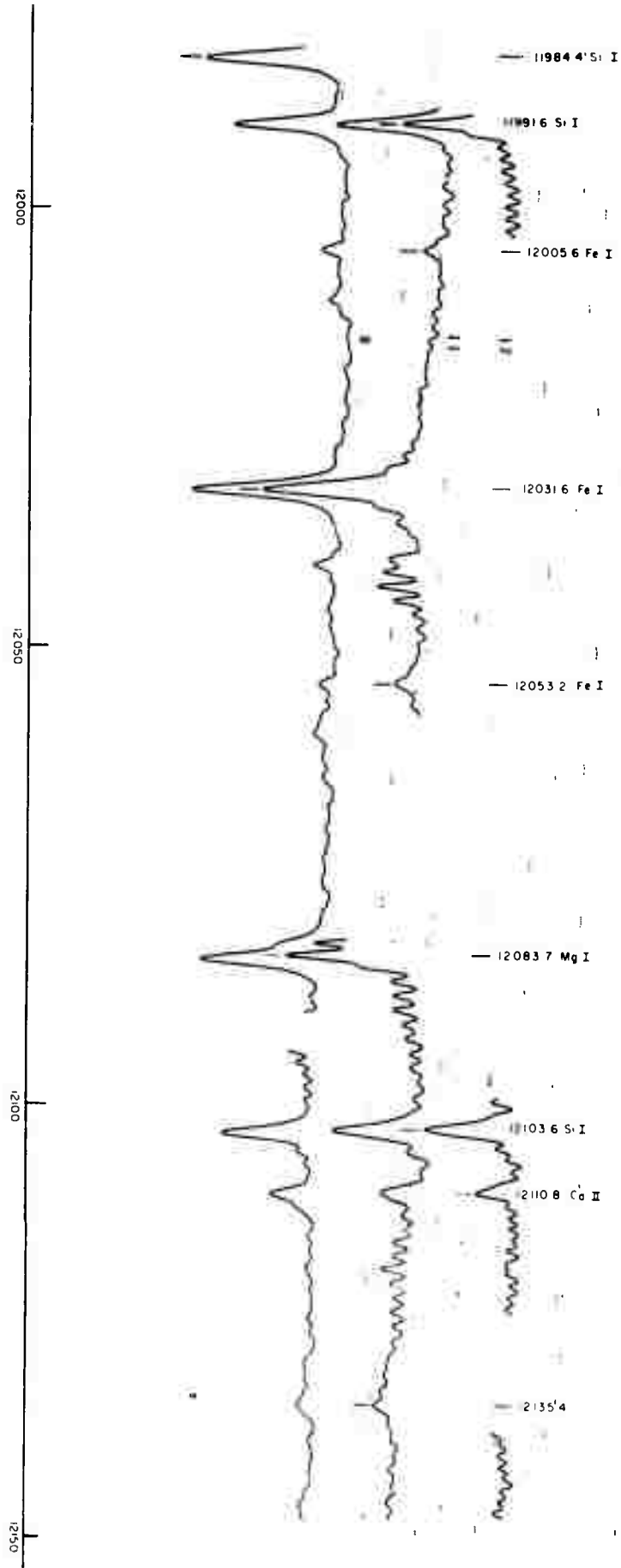
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FIG 2 SEC 1

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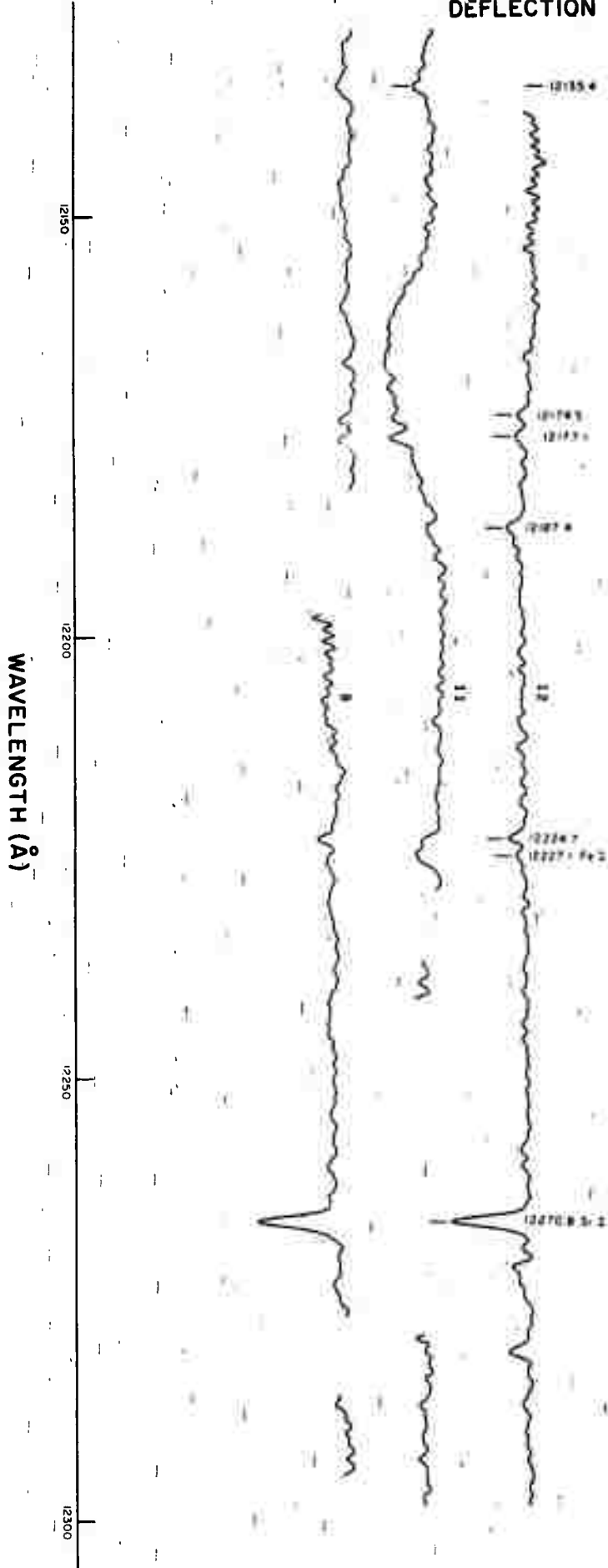
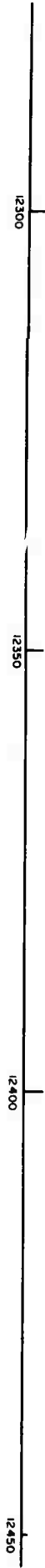


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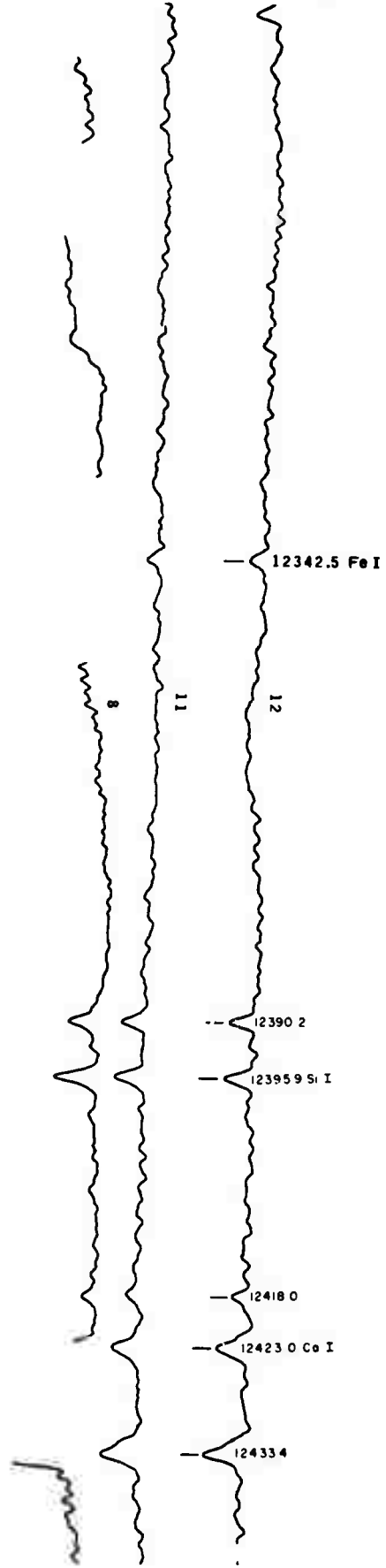
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FIG 2 SEC 3

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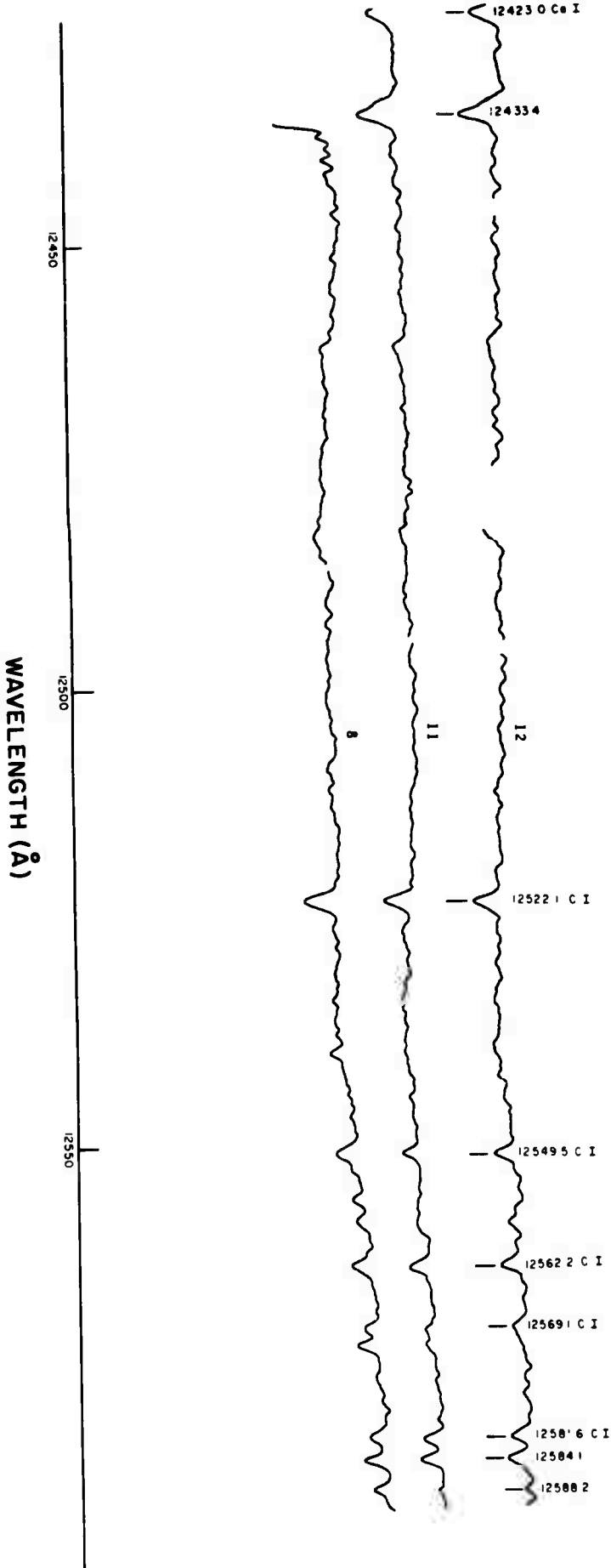


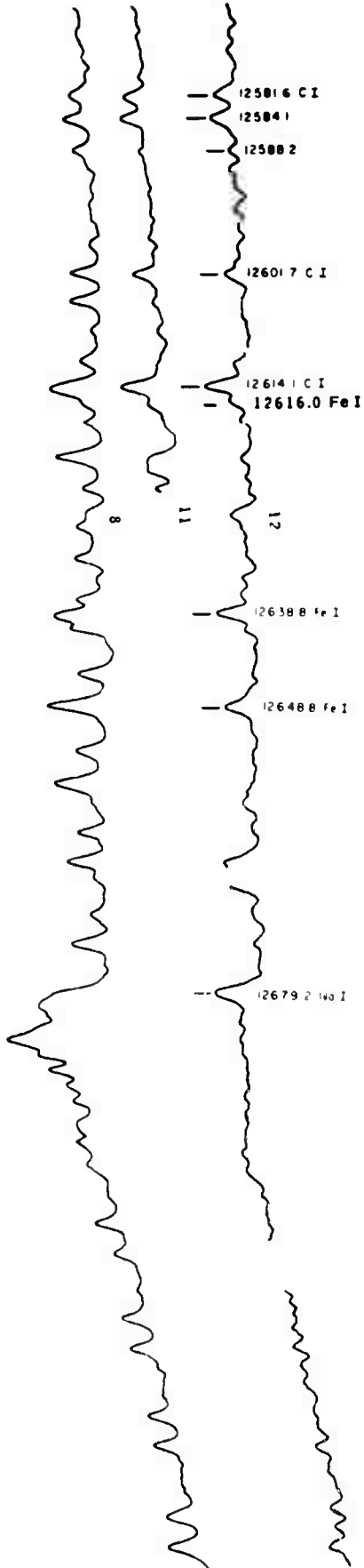
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FIG 2 SEC 5

WAVELENGTH (Å)



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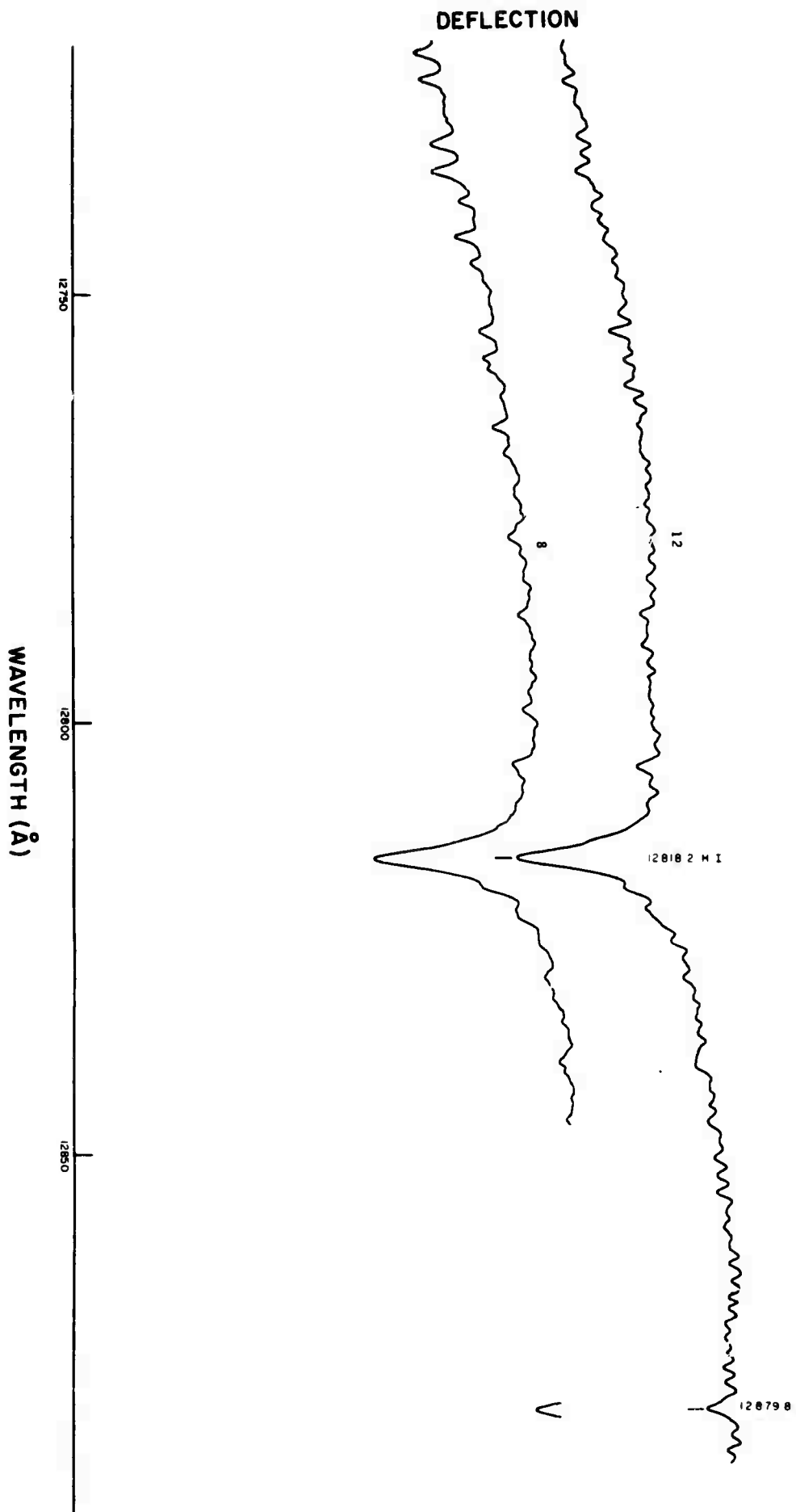


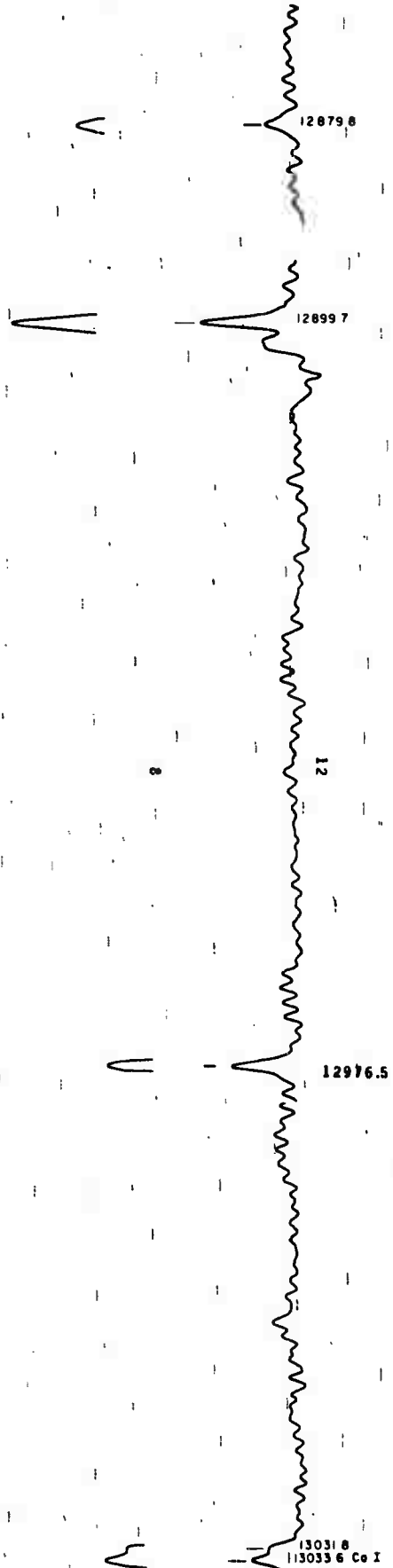
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FIG 2 SEC 7

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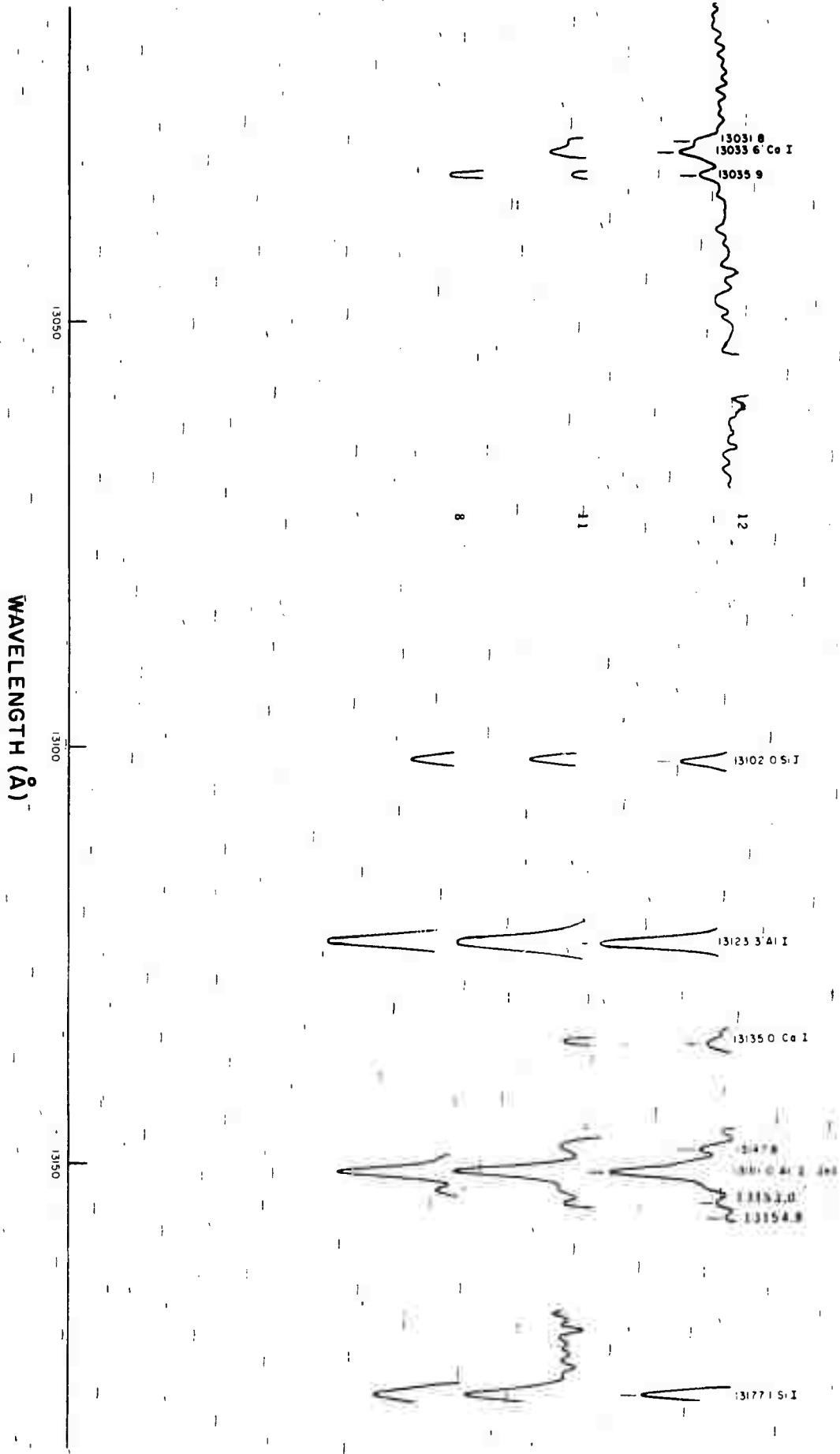


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FIG 2 SEC 8



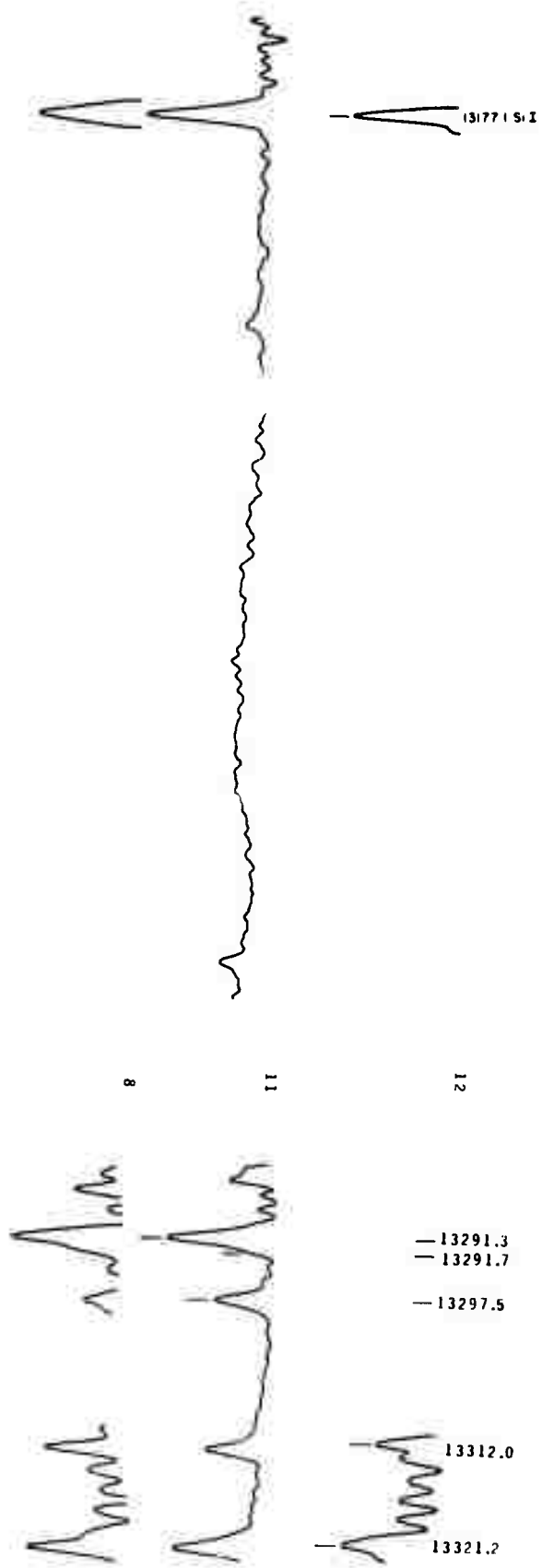
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FIG 2 SEC 9

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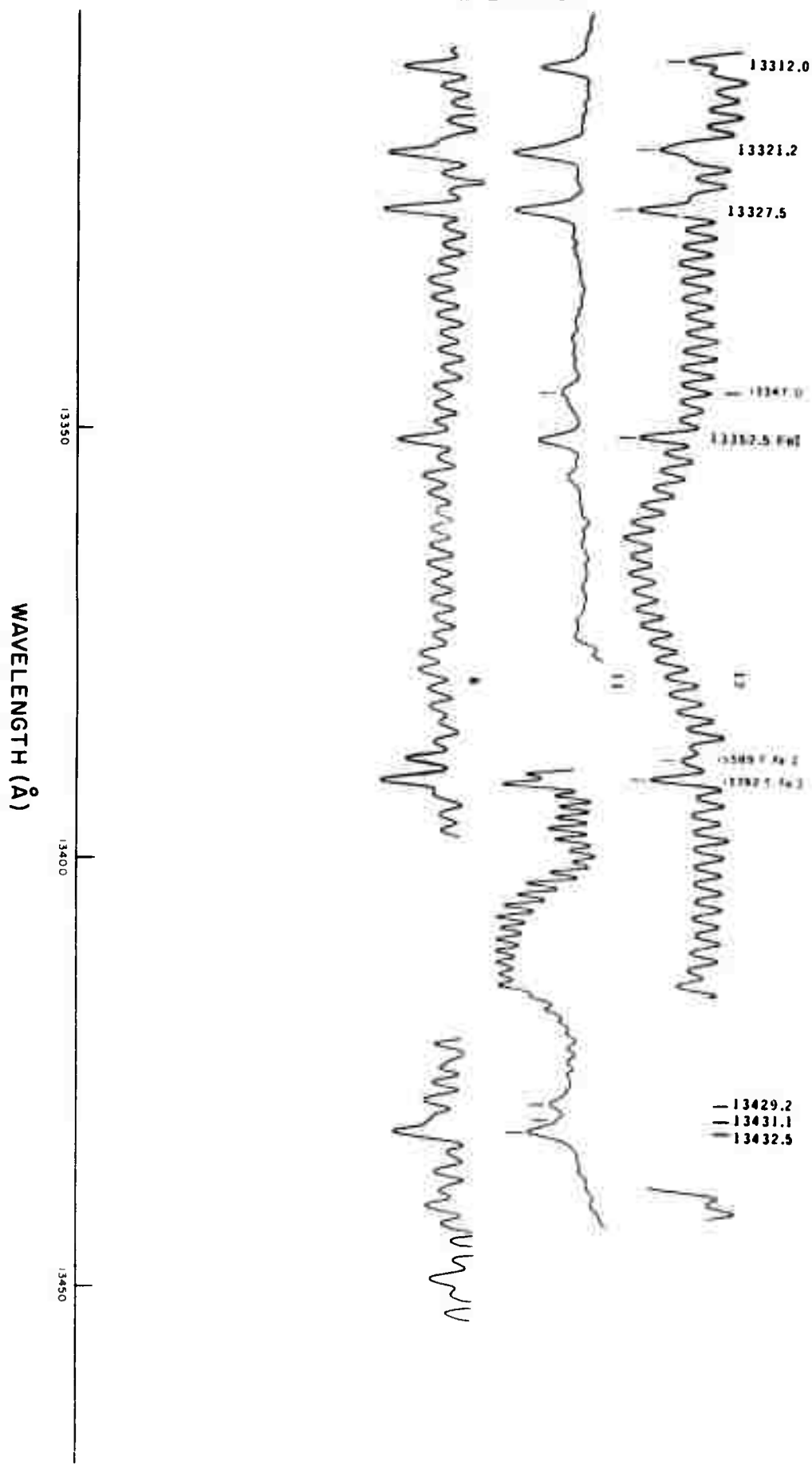


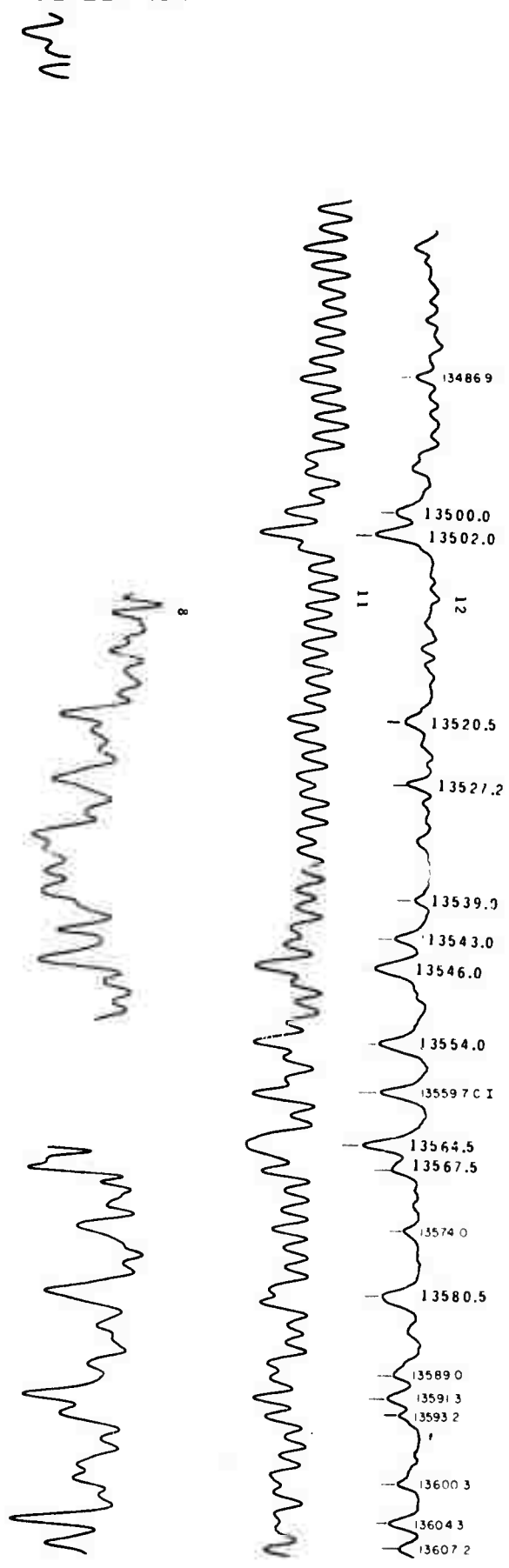
FIG 2 SEC 10

FIG 2 SEC 11

WAVELENGTH (Å)



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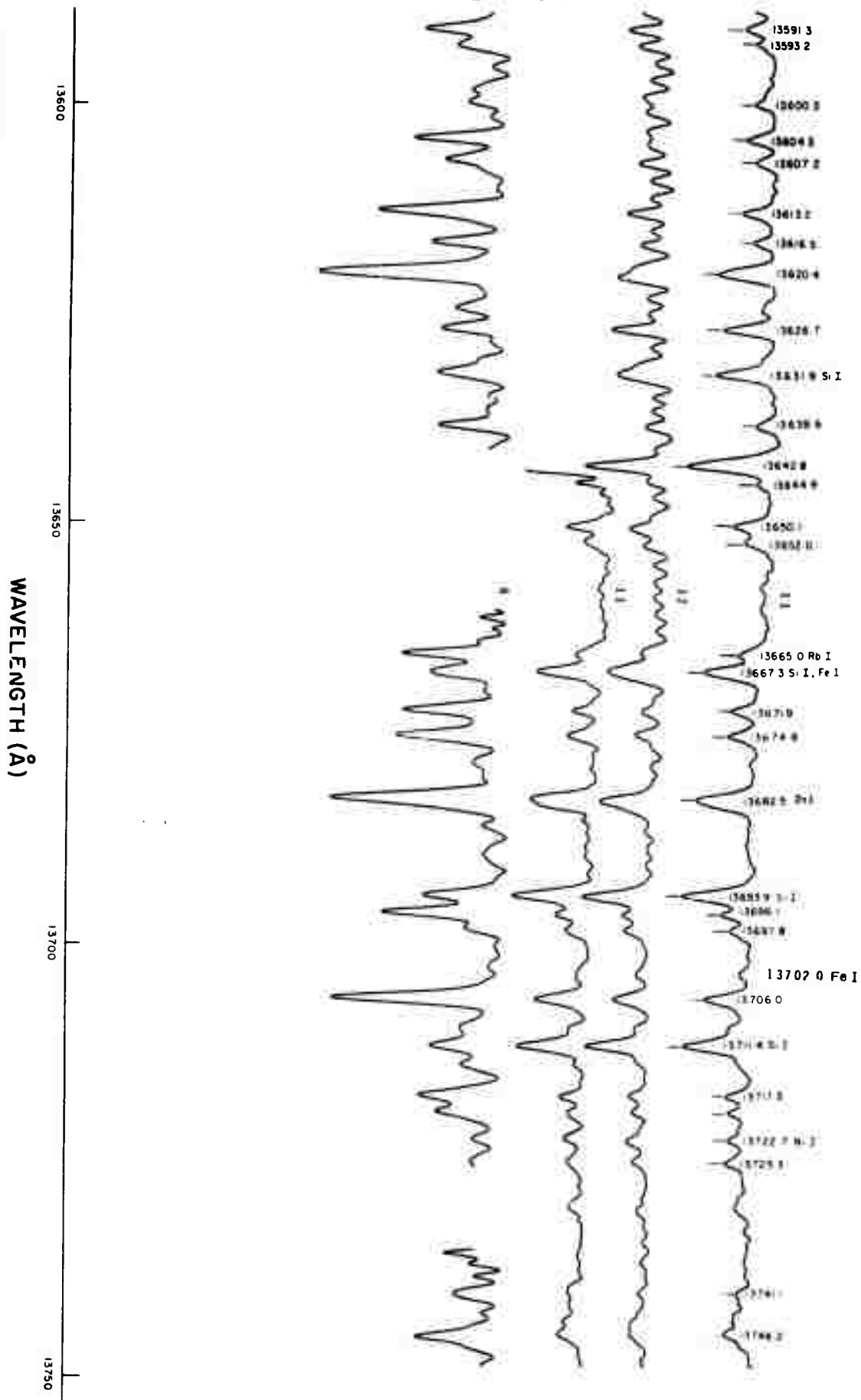
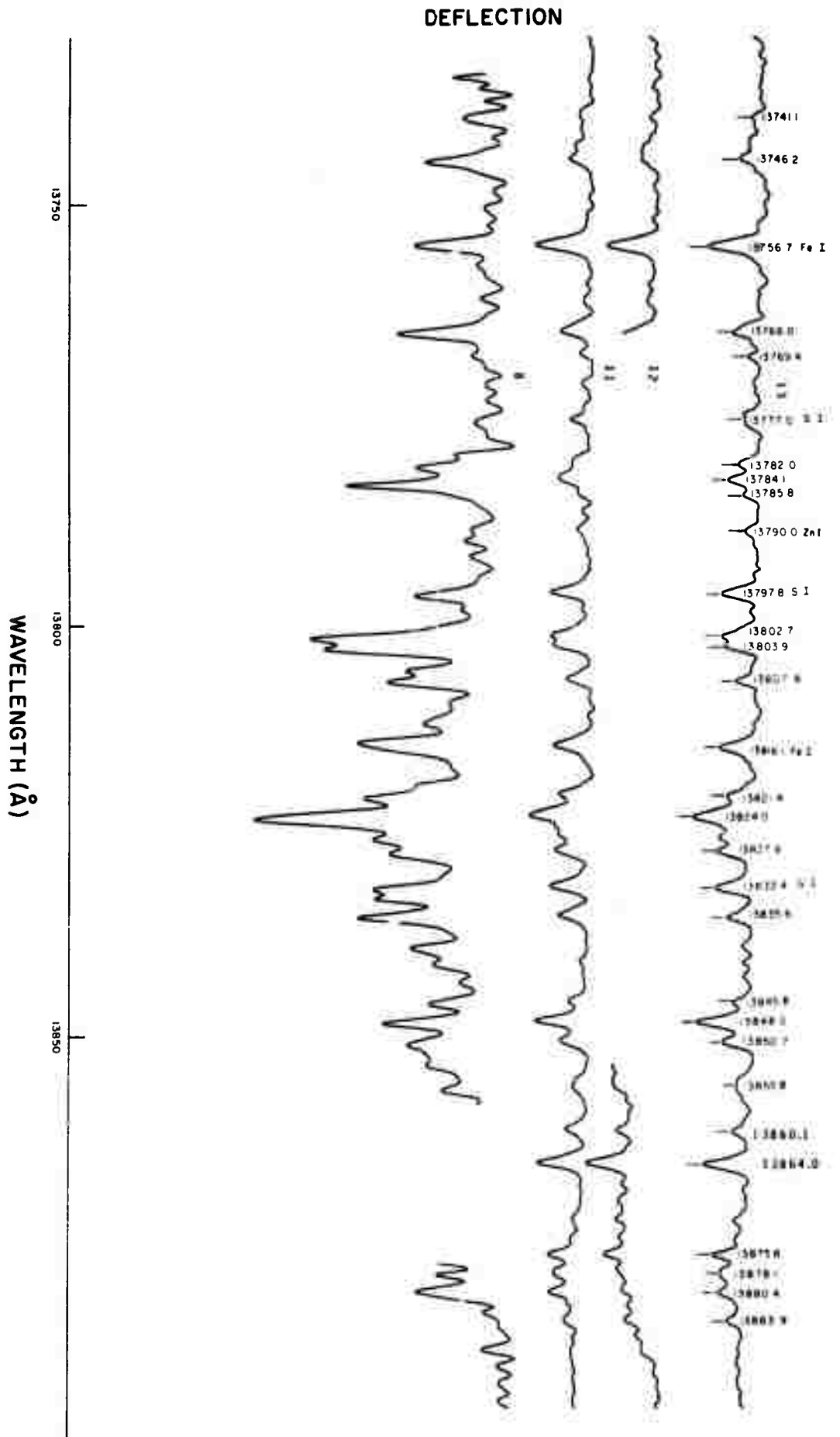


FIG 2 SEC 12

FIG 2 SEC 13



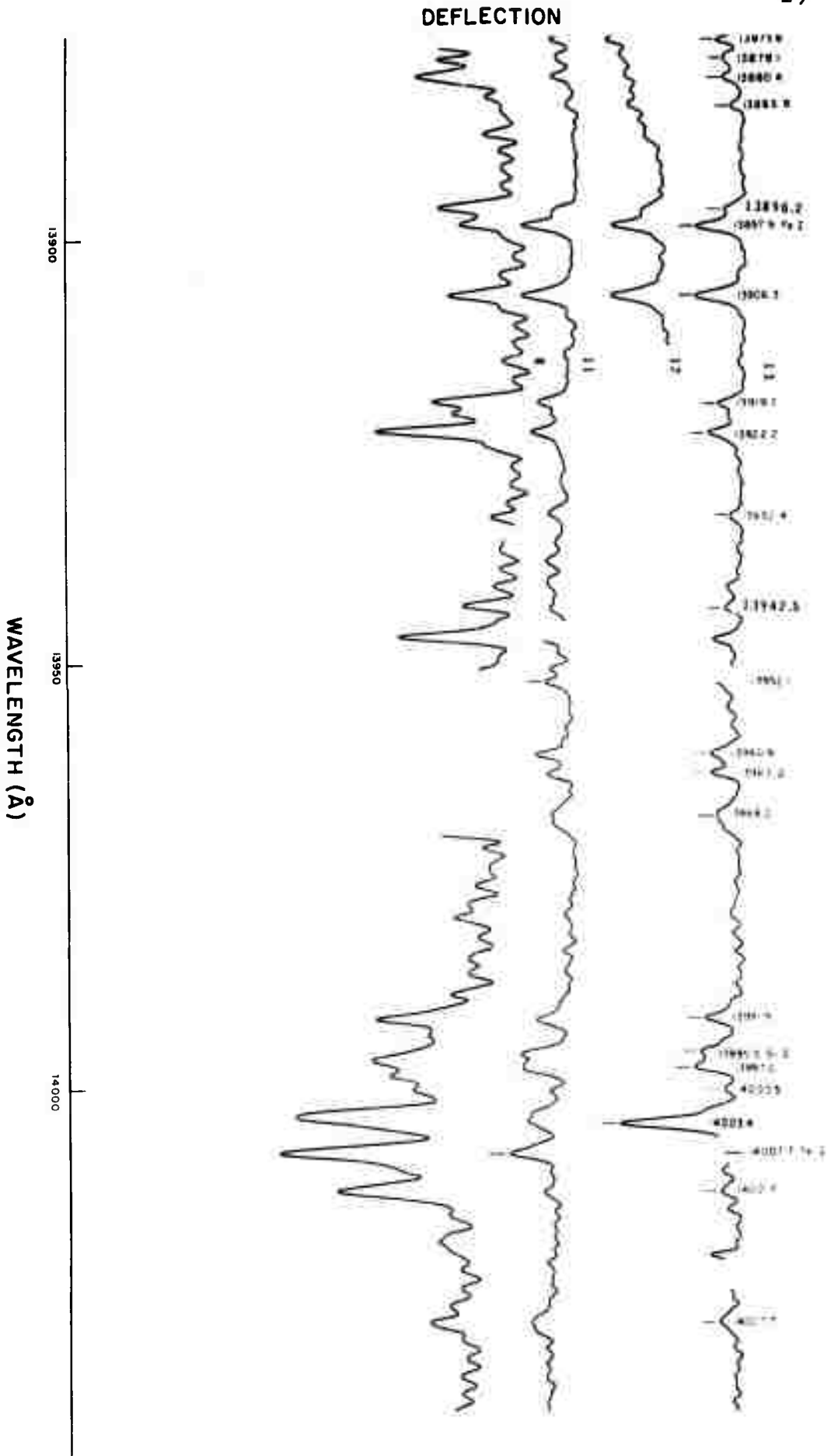


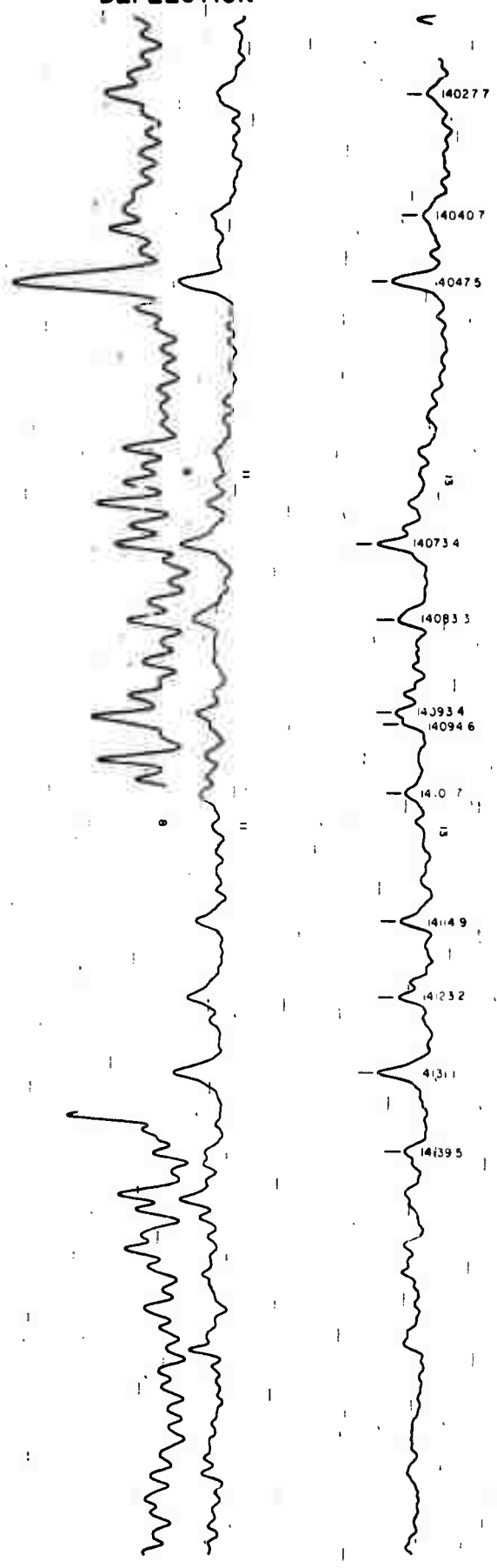
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FIG 2 SEC 15

WAVELENGTH (Å)



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FIG 2 SEC 16

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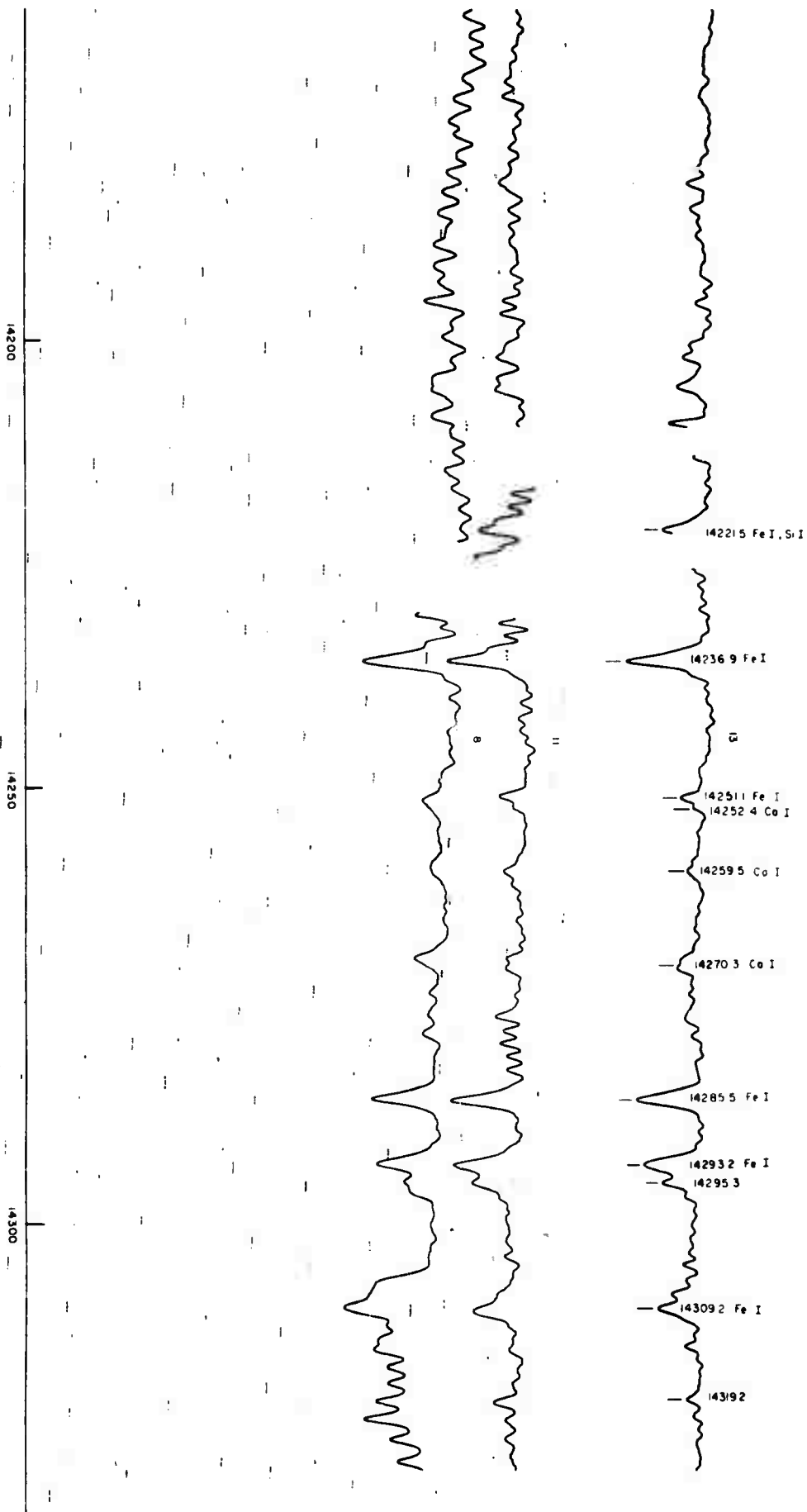
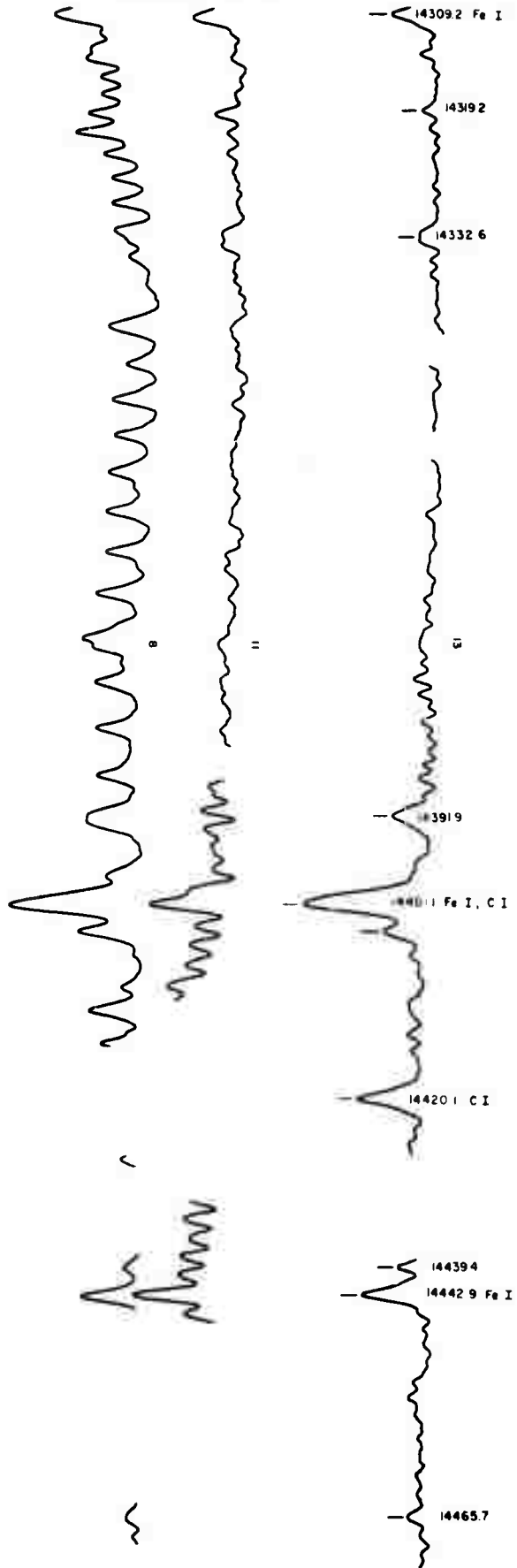


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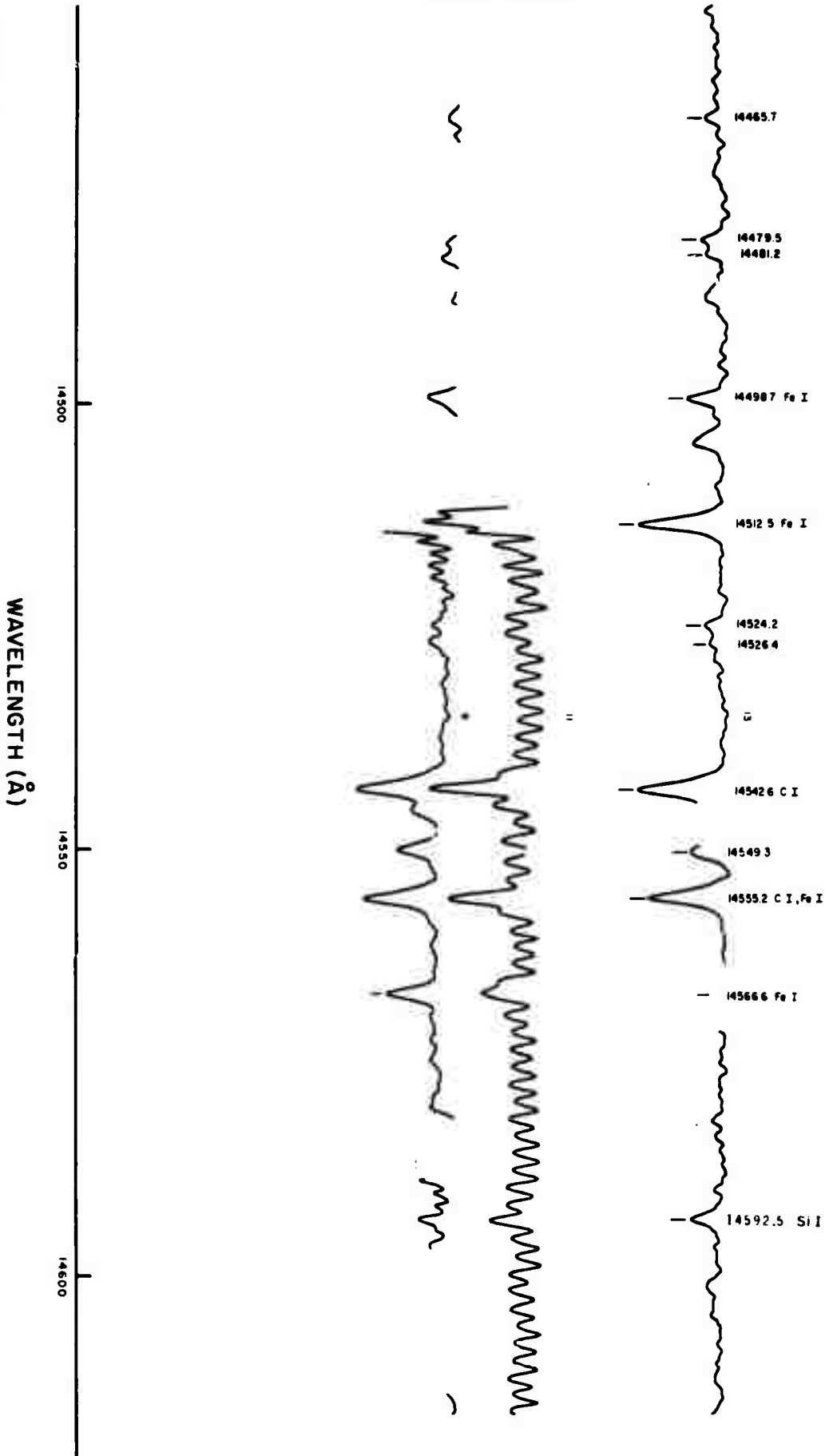


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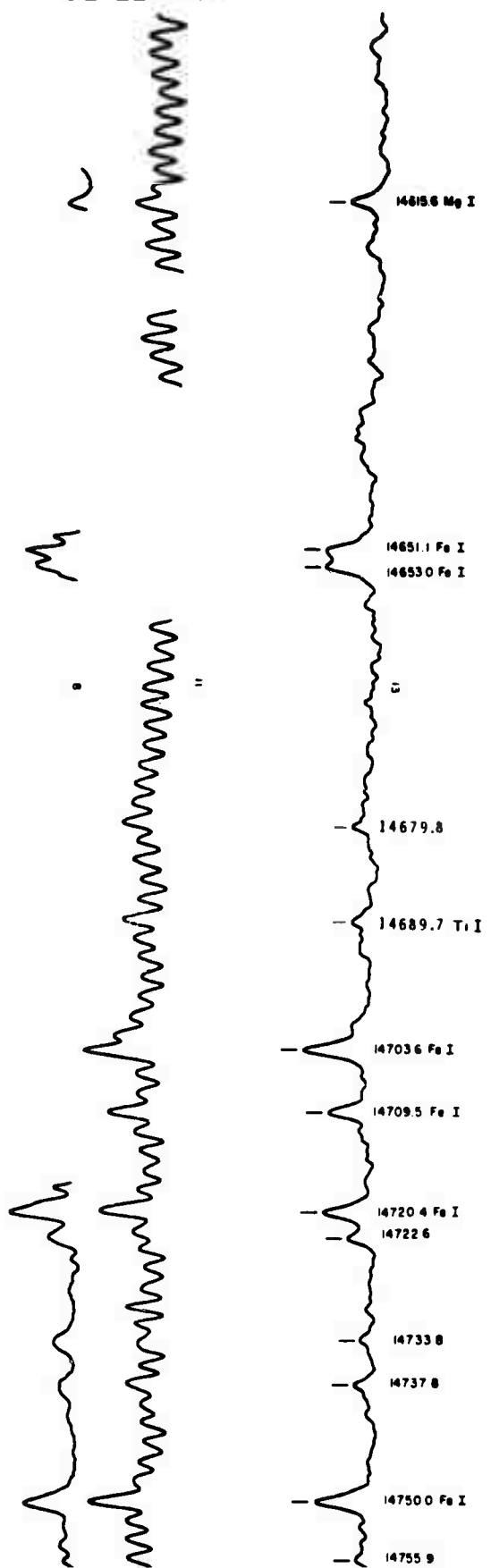
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FIG 2 SEC 19

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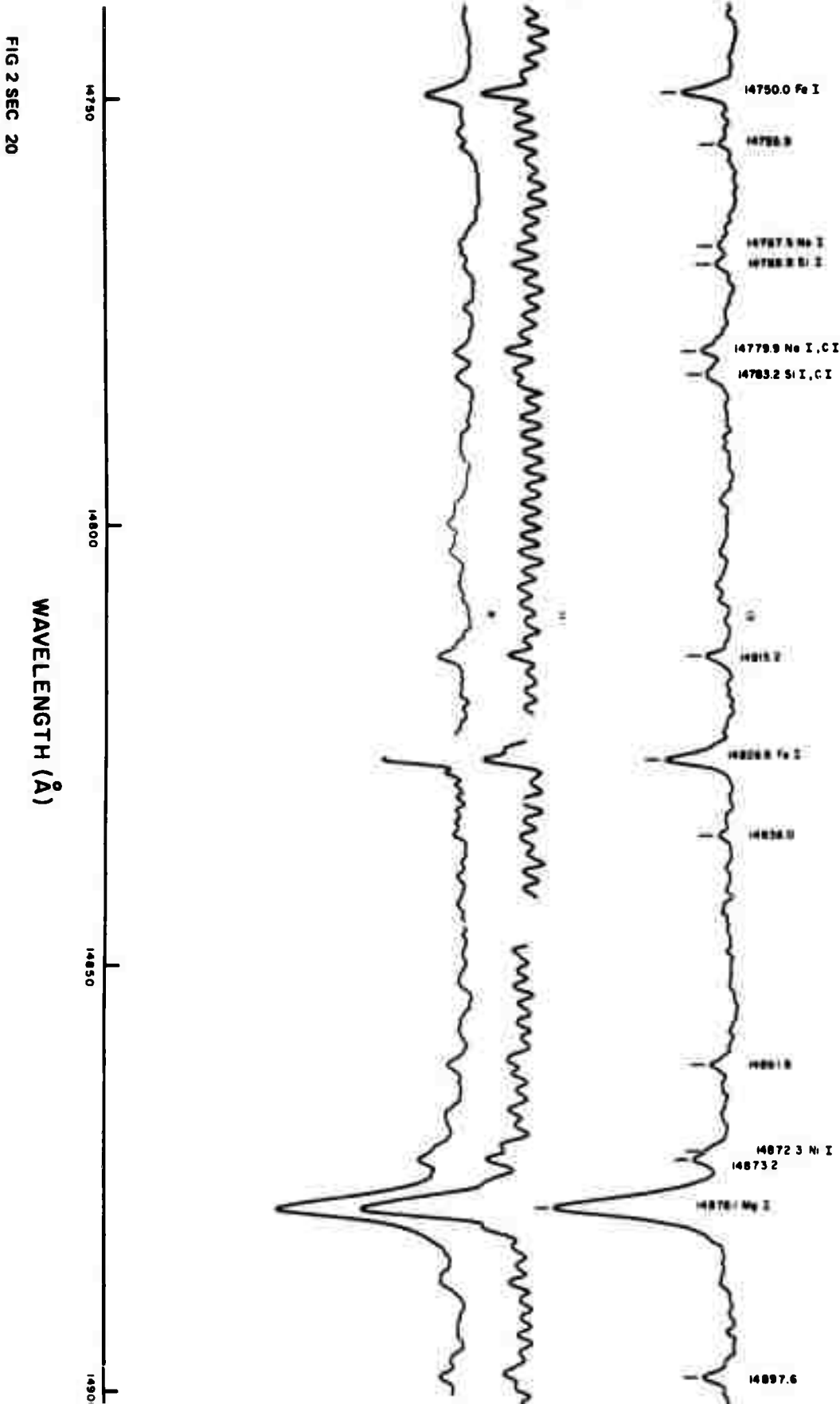
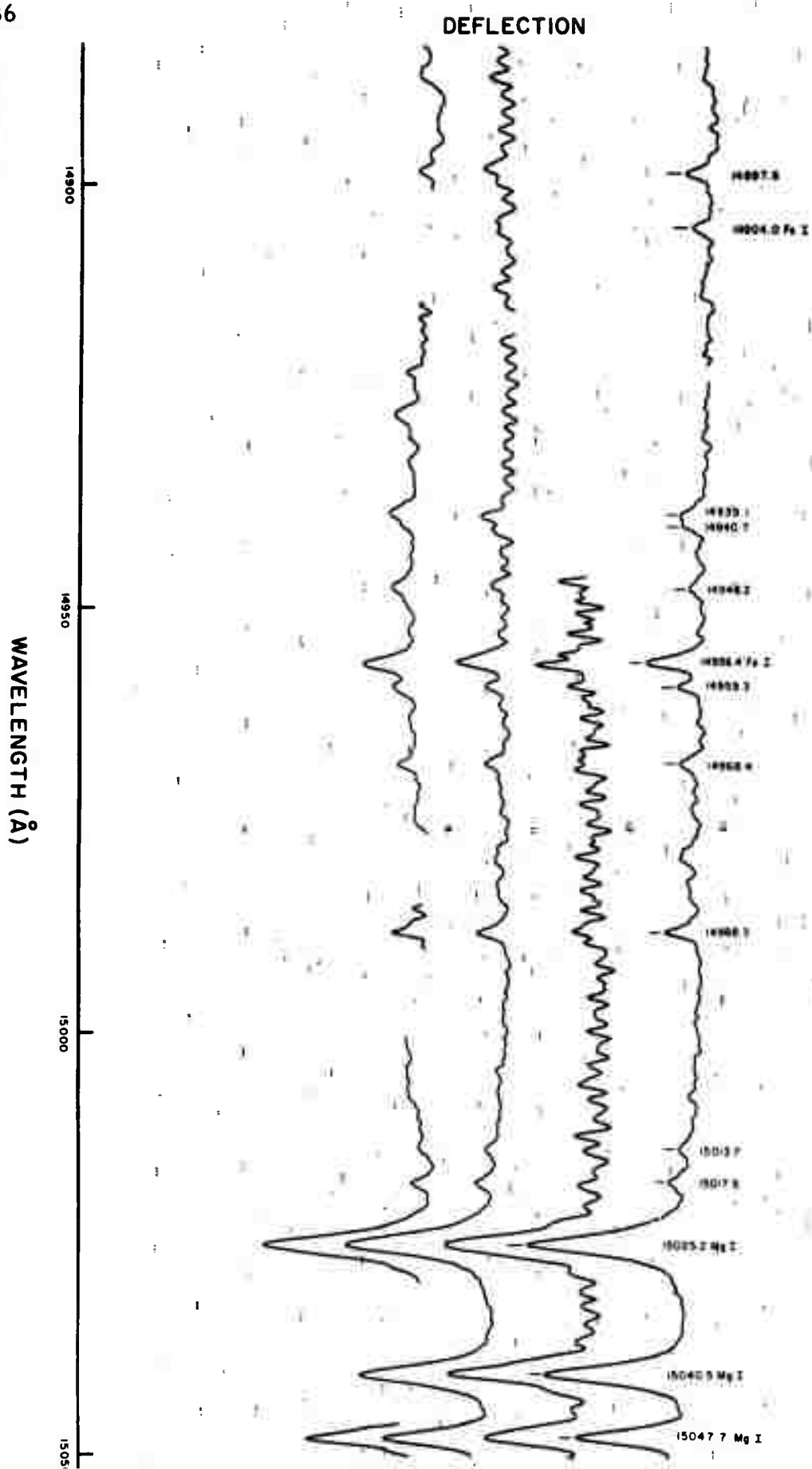


FIG 2 SEC 20

WAVELENGTH (Å)

FIG 2 SEC 21



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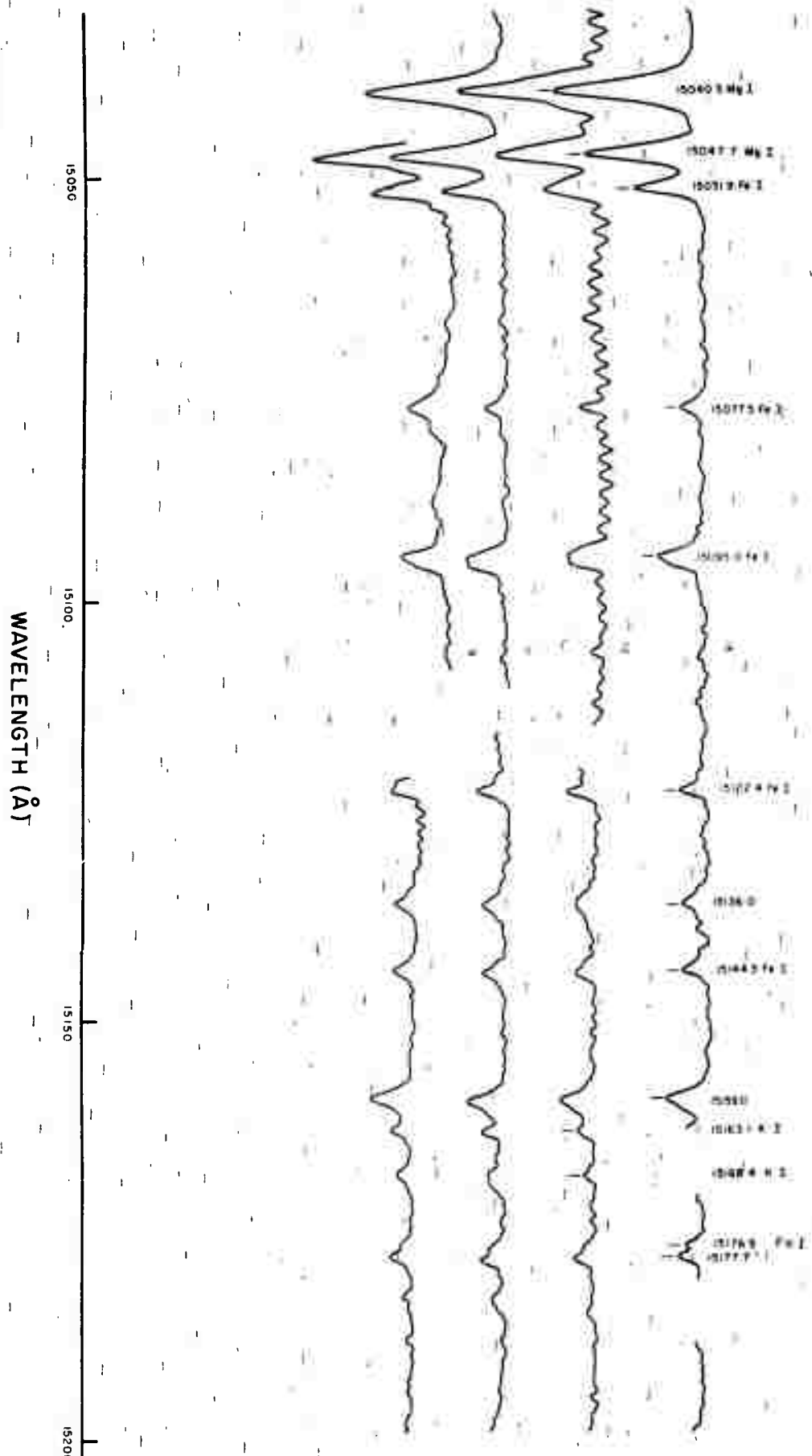


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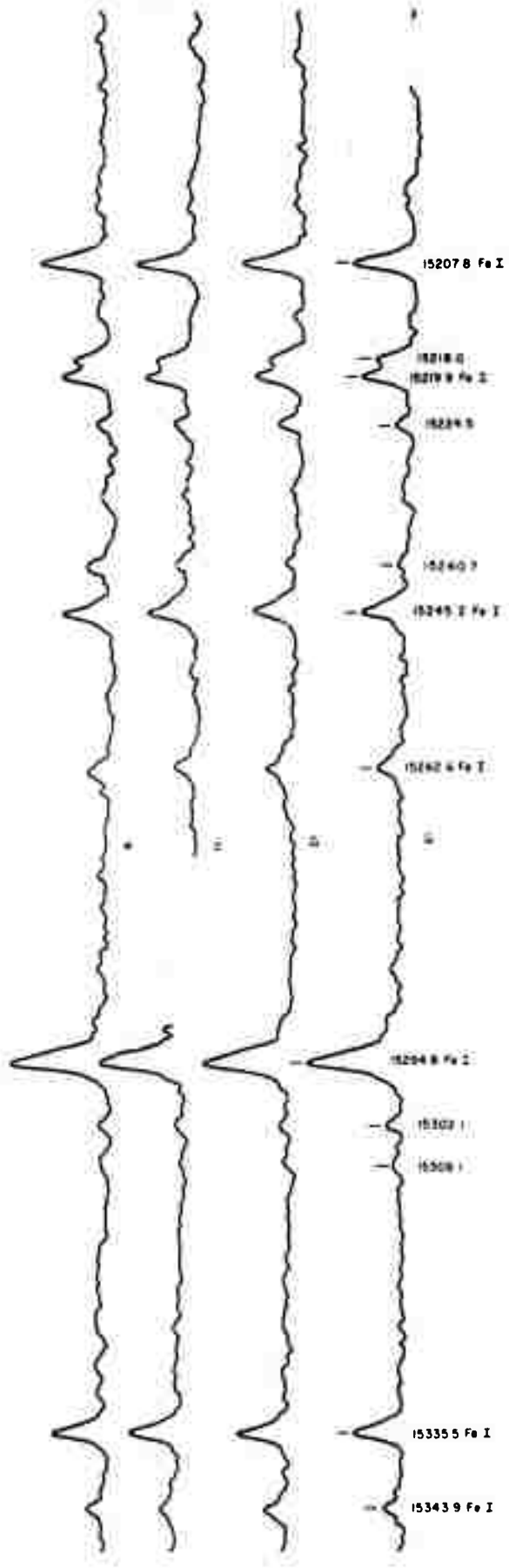
WAVELENGTH (Å)

FIG 2 SEC 23

WAVELENGTH (Å)



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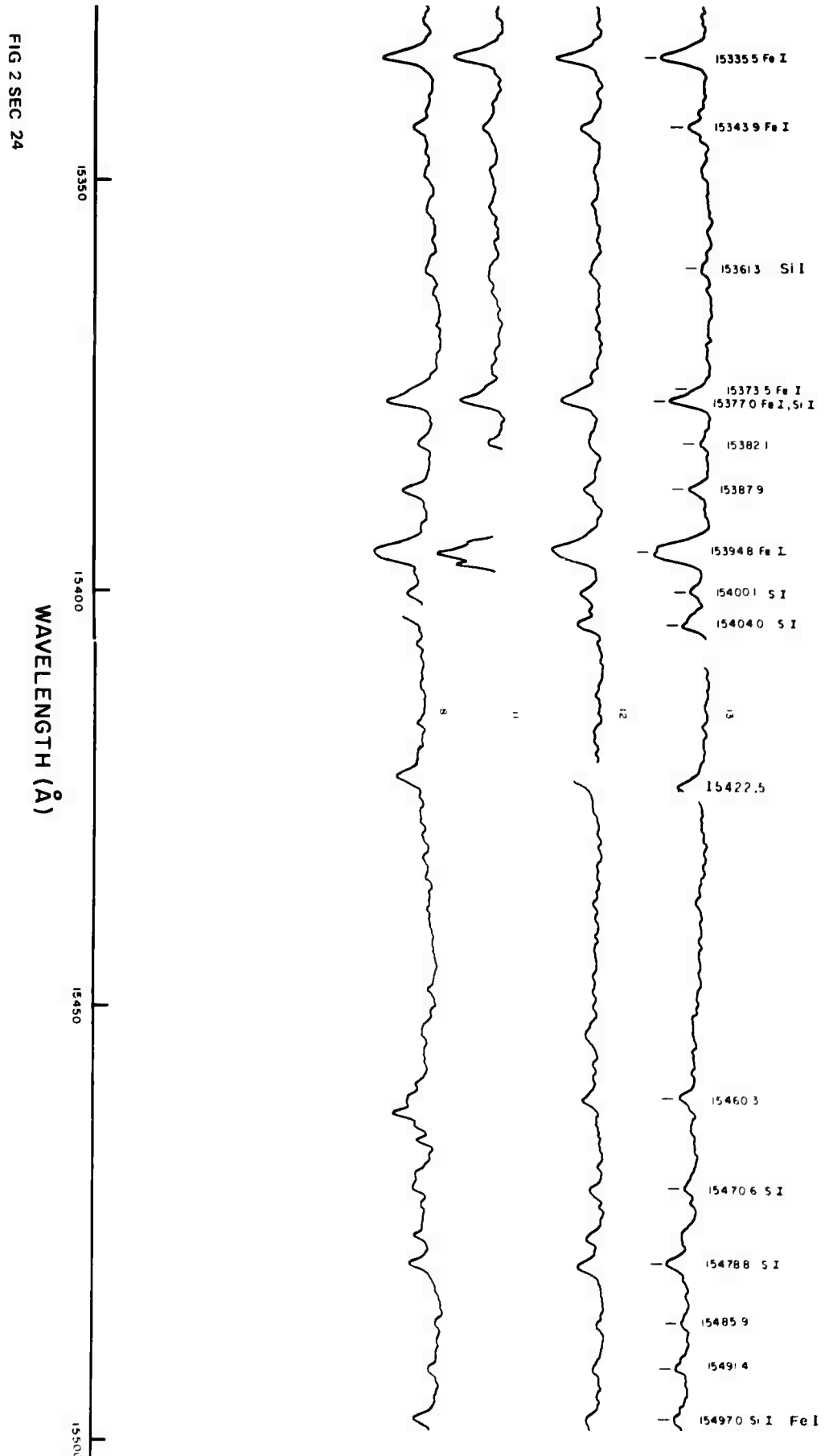


FIG 2 SEC 24

FIG 2 SEC 25

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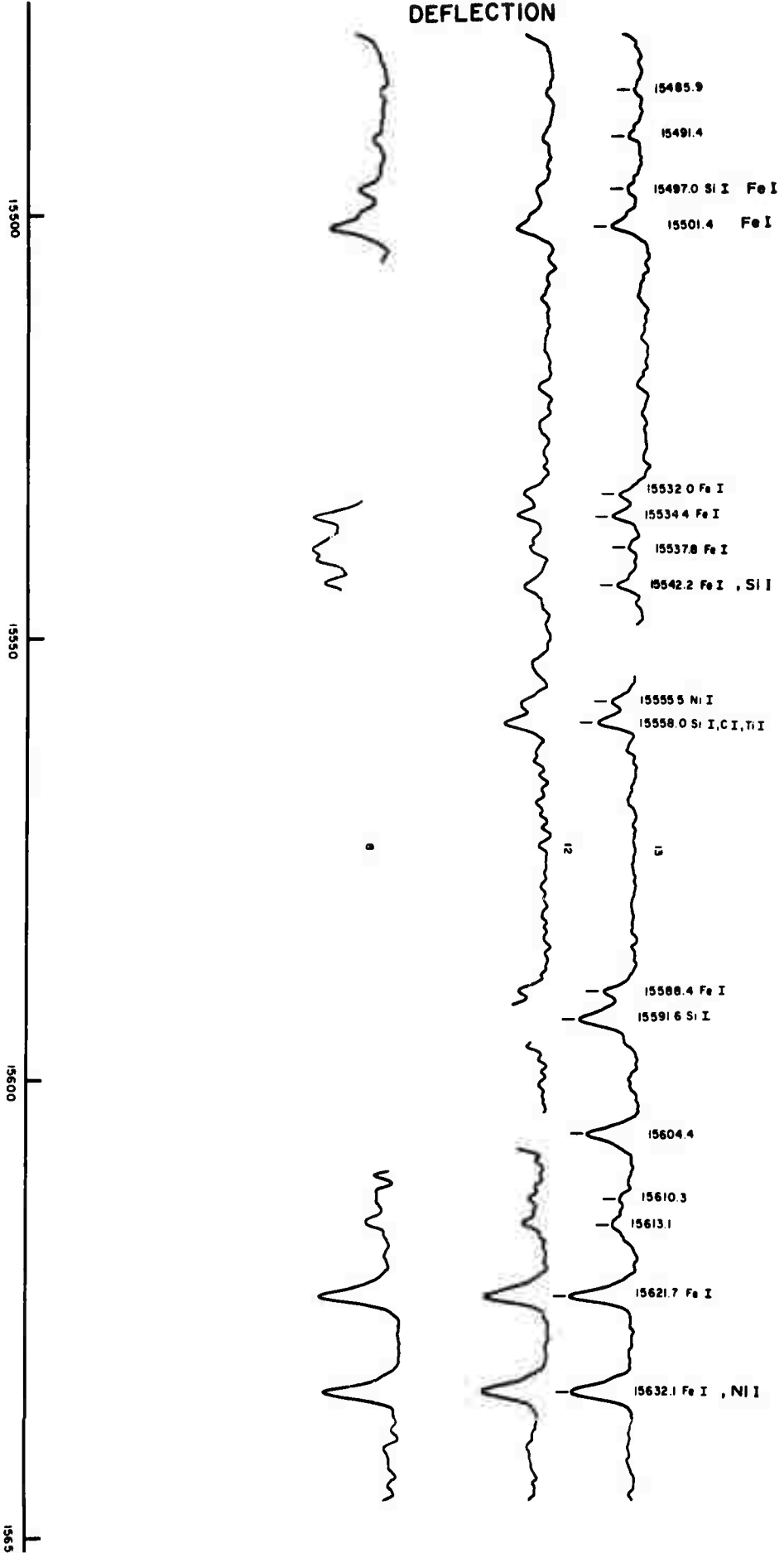


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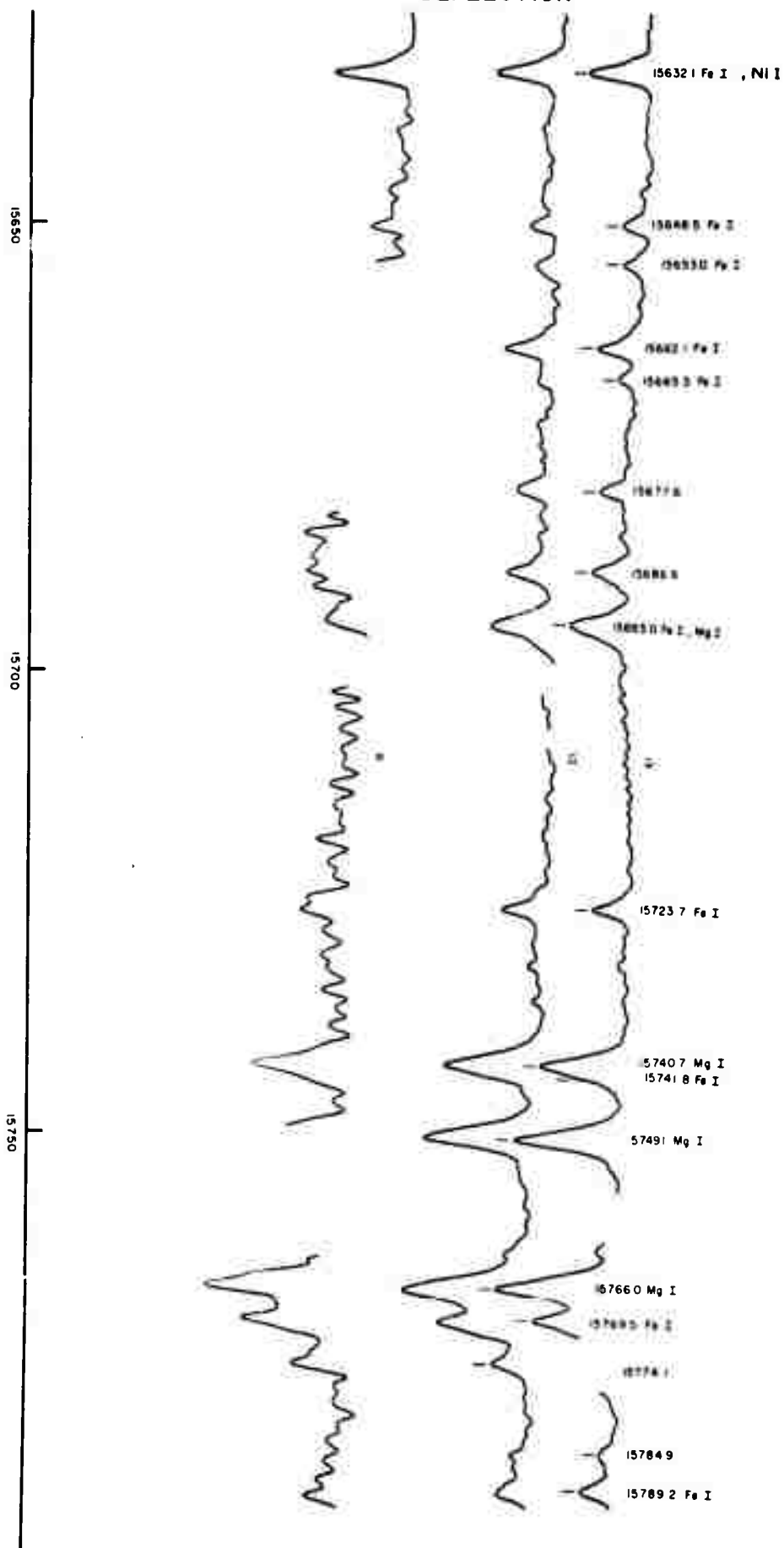
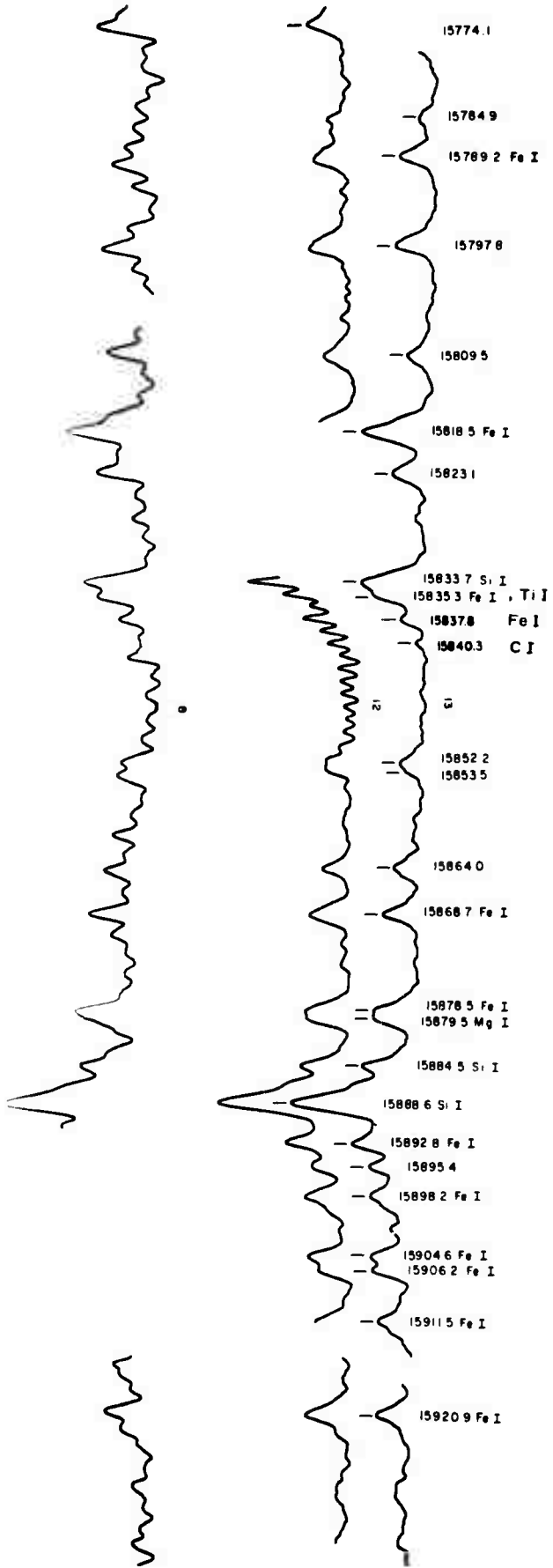


FIG 2 SEC 27

WAVELENGTH (Å)



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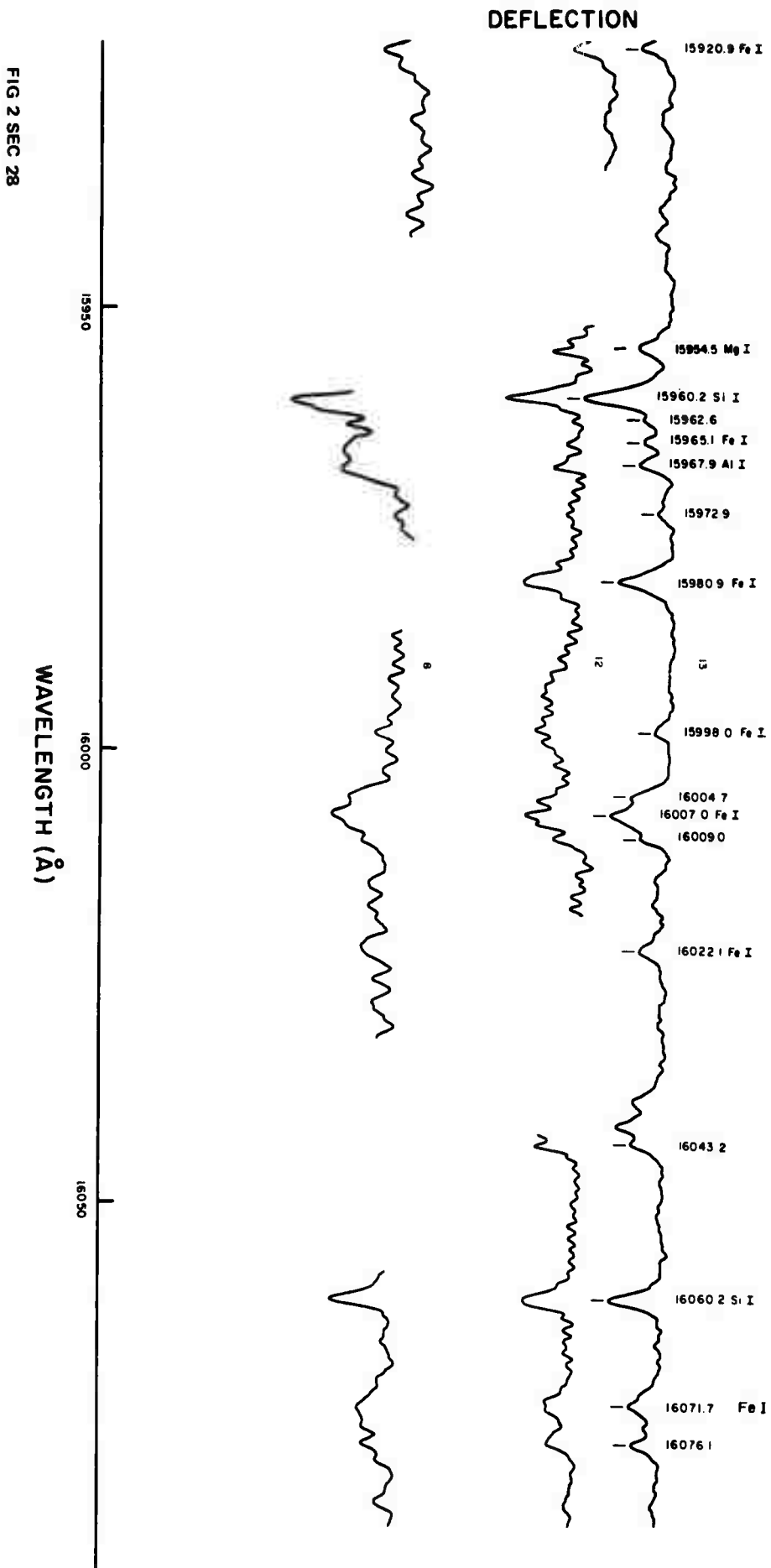
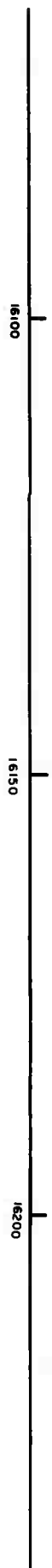


FIG 2 SEC 28

FIG 2 SEC 29

WAVELENGTH (Å)



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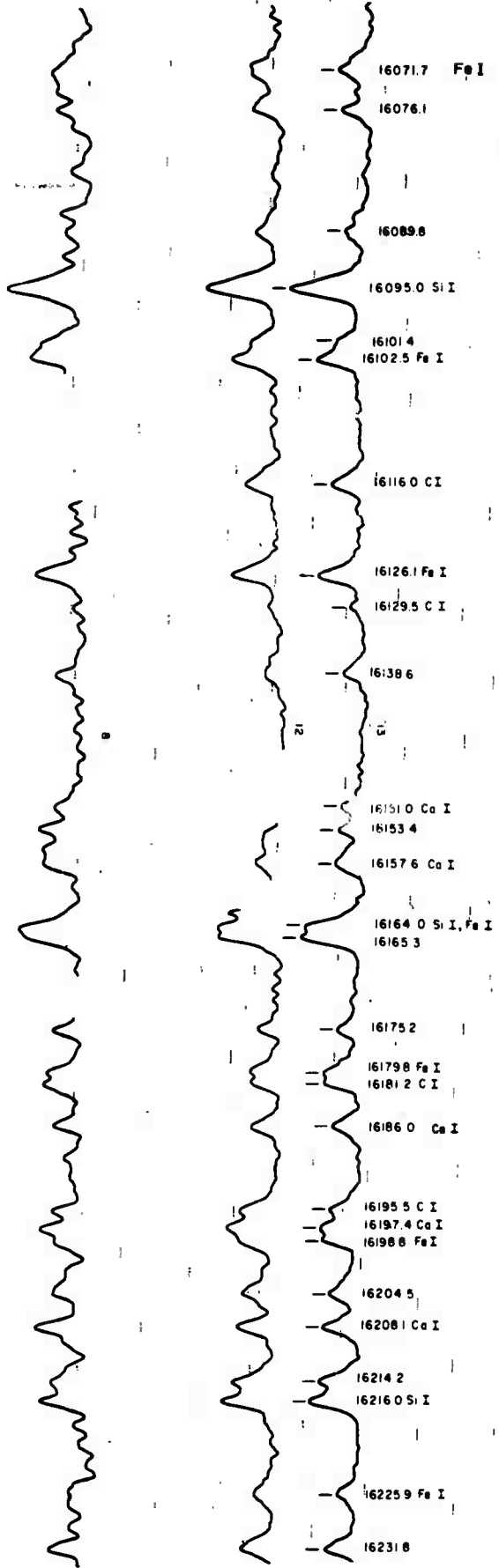


FIG 2 SEC 30

WAVELENGTH (Å)

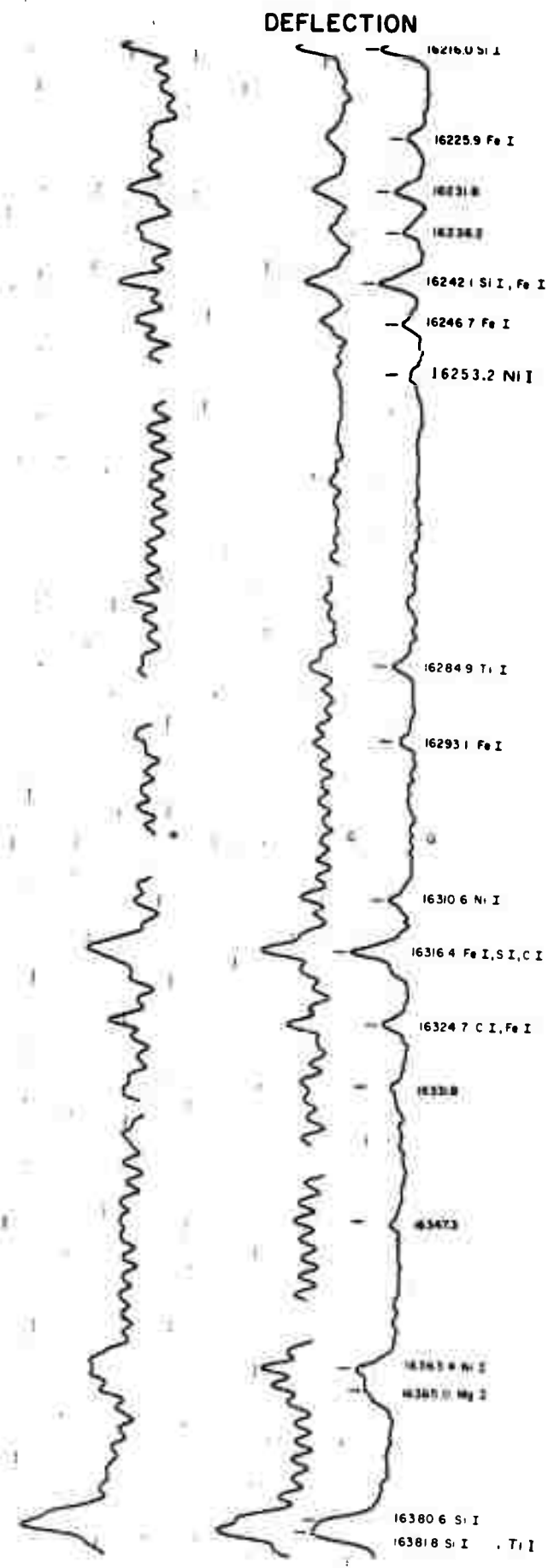
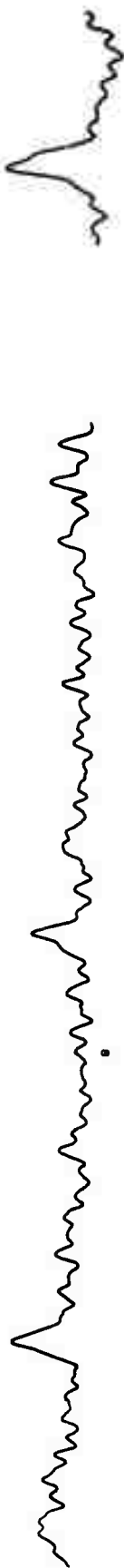
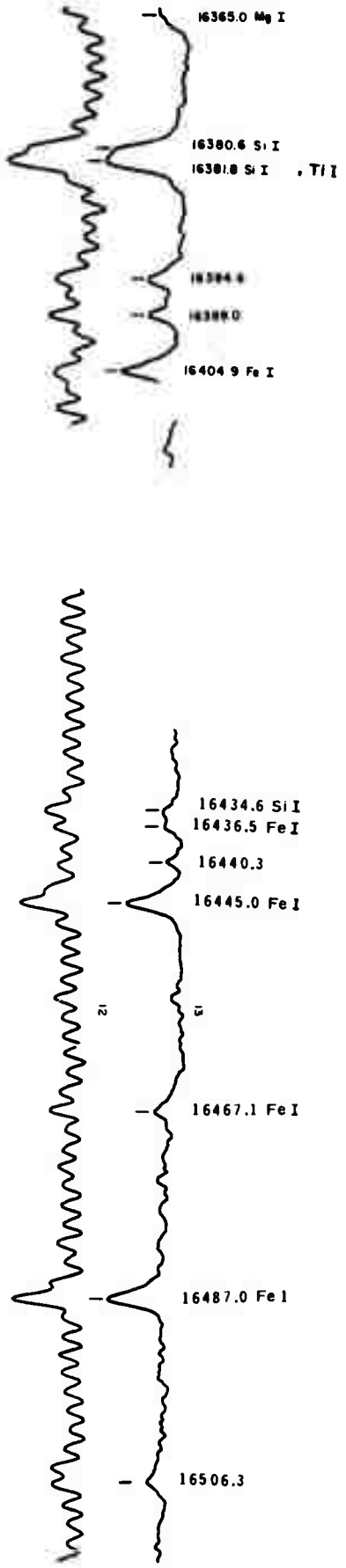


FIG 2 SEC 31

WAVELENGTH (Å)



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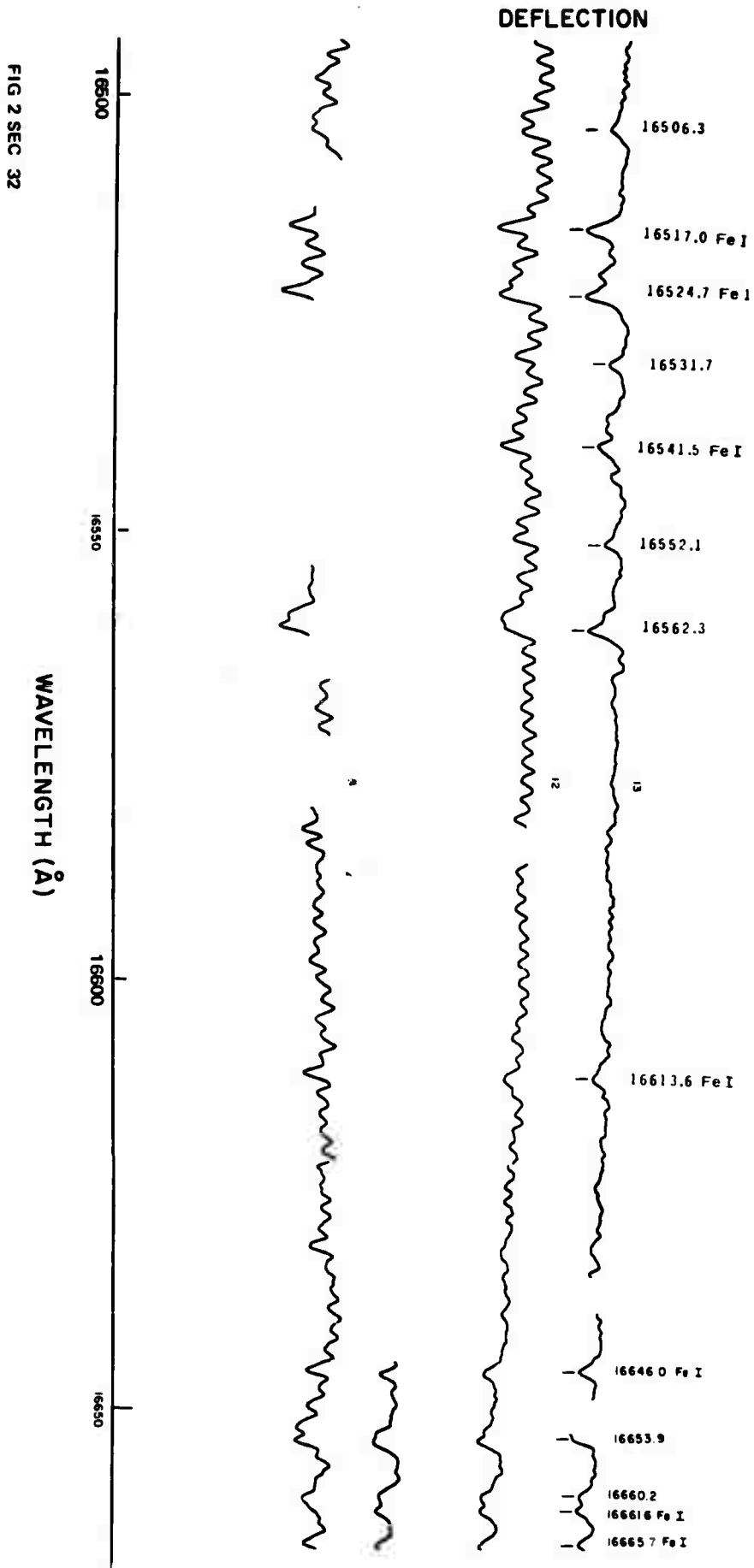
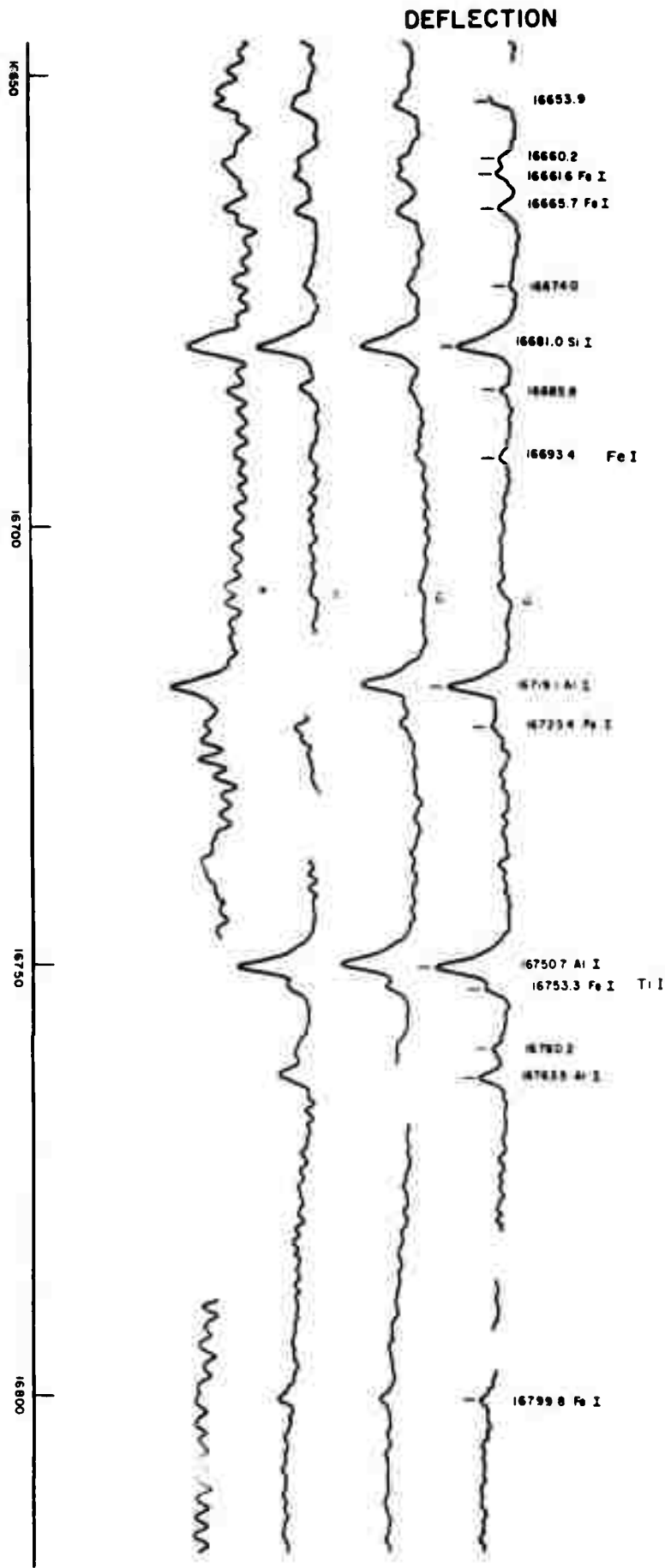


FIG 2 SEC 33

WAVELENGTH (Å)



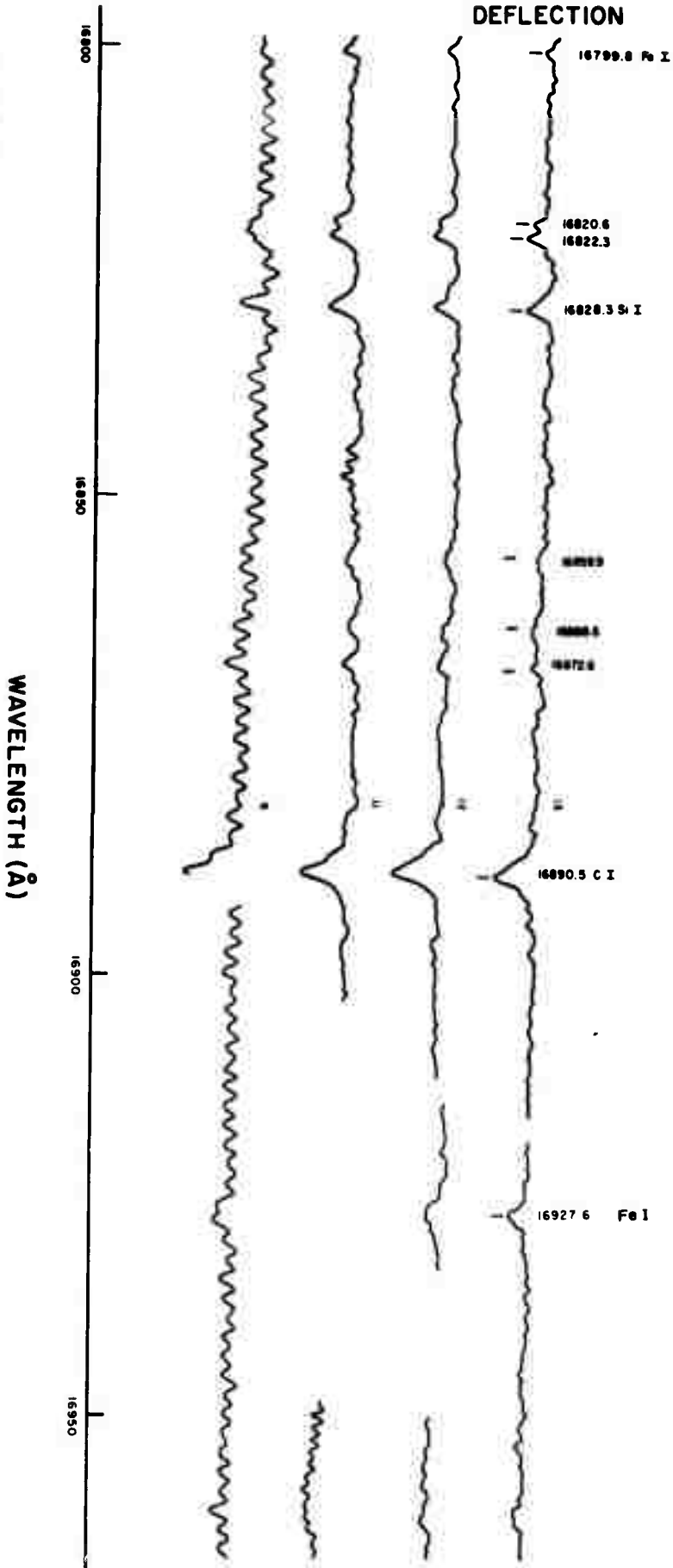


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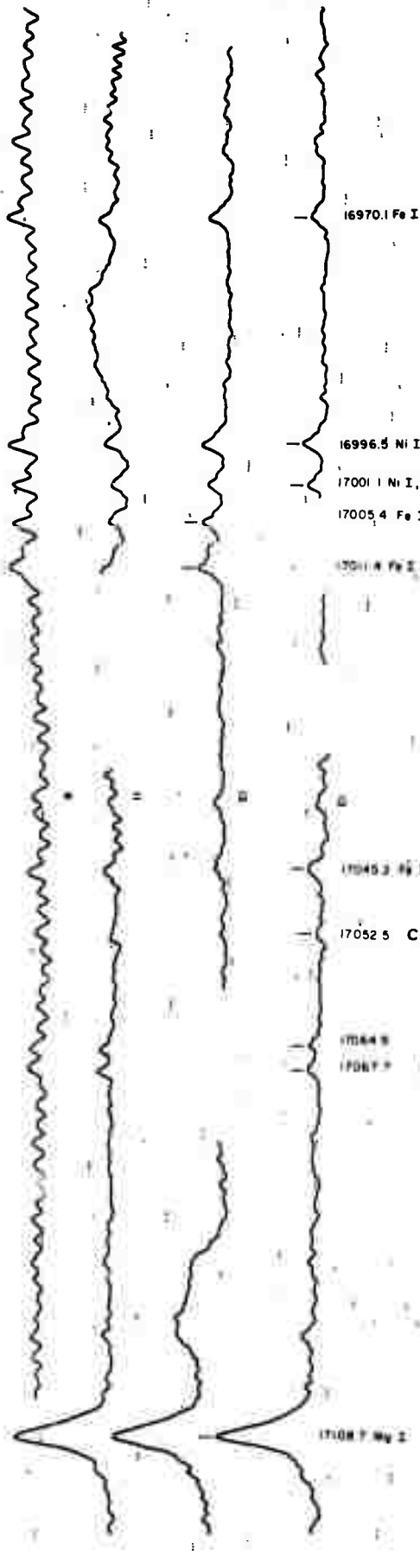
WAVELENGTH (Å)

FIG 2 SEC 35

WAVELENGTH (Å)



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WAVELENGTH (Å)

FIG 2 SEC 36

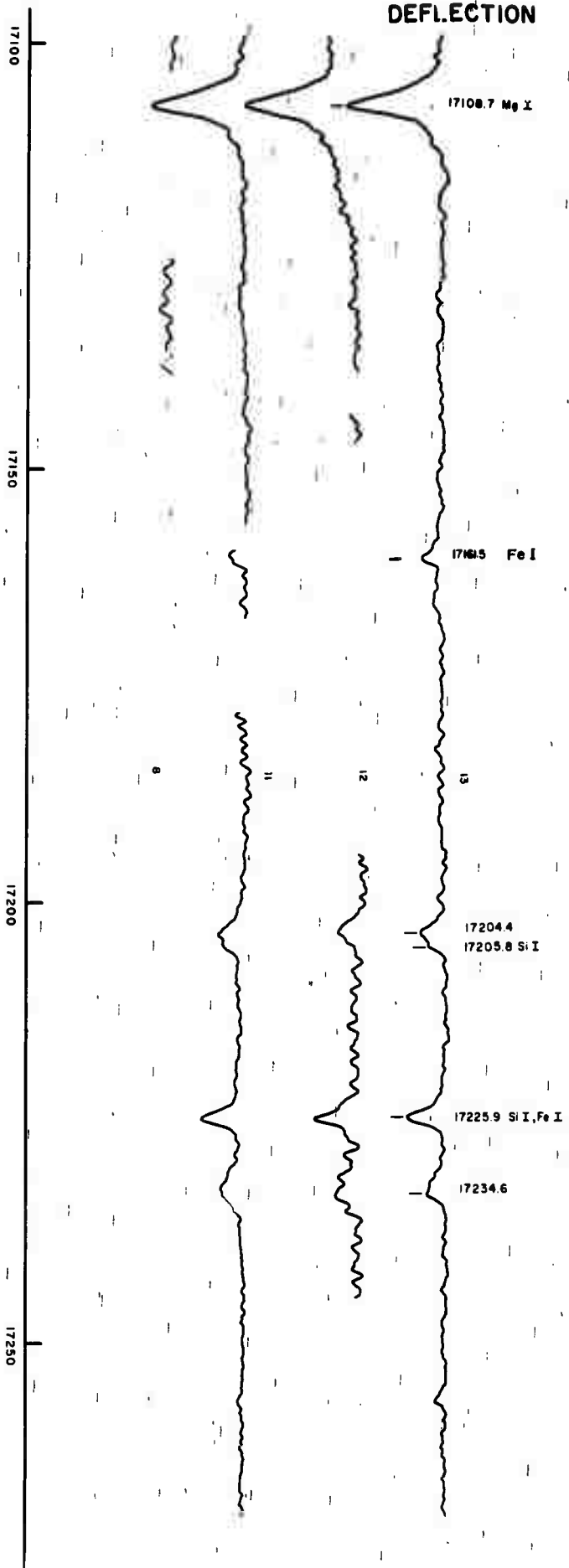
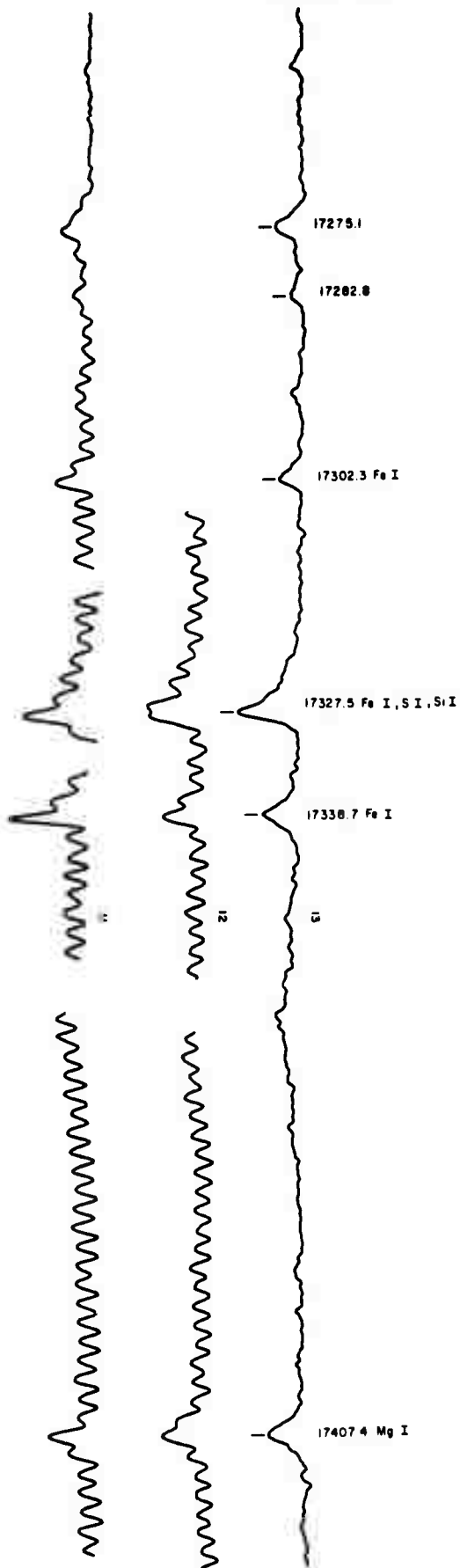


FIG 2 SEC 37

WAVELENGTH (Å)



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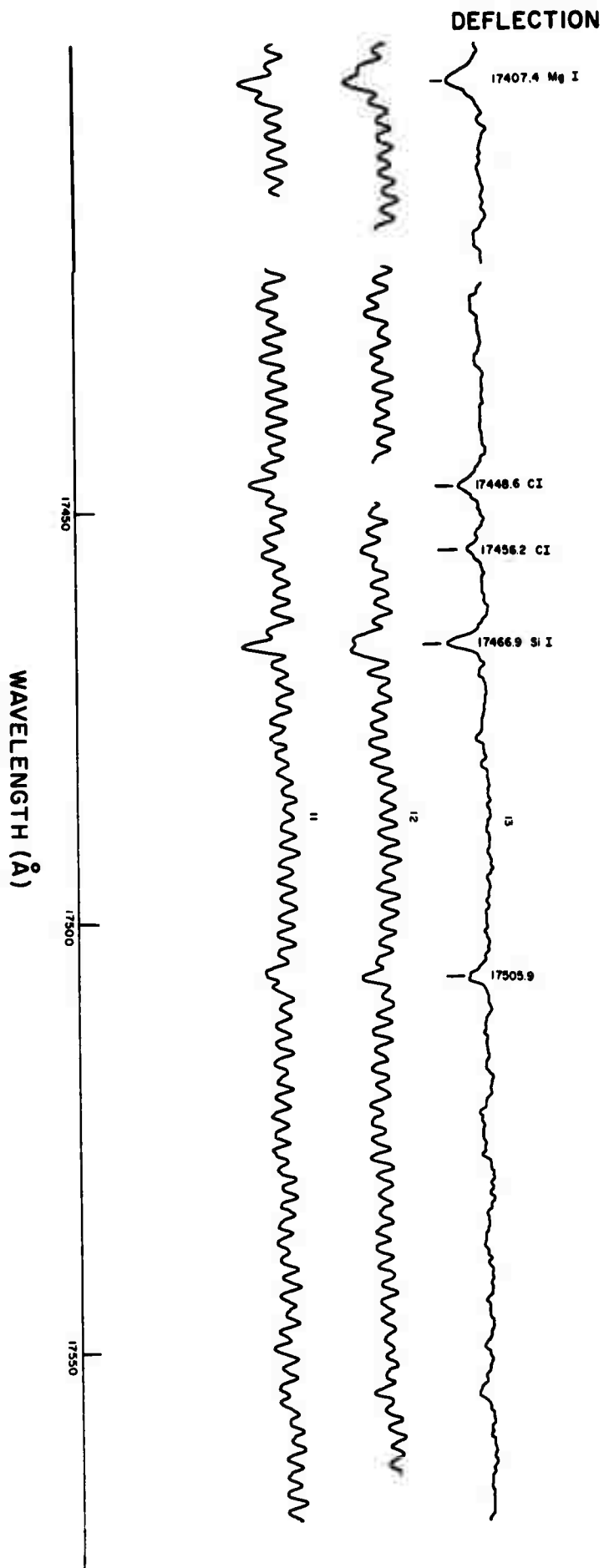


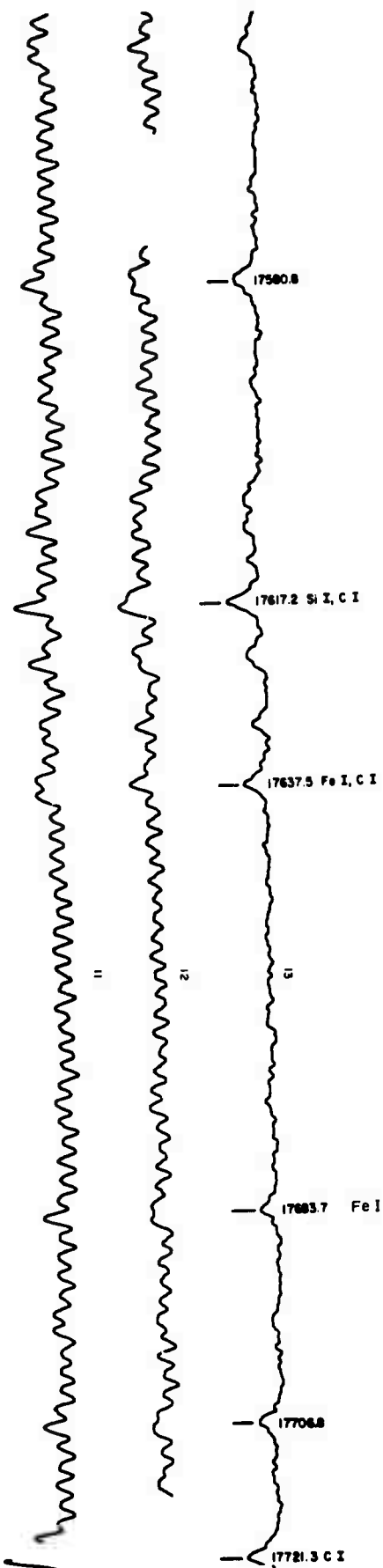
FIG 2 SEC 38

FIG 2 SEC 39

WAVELENGTH (Å)



DEFLECTION



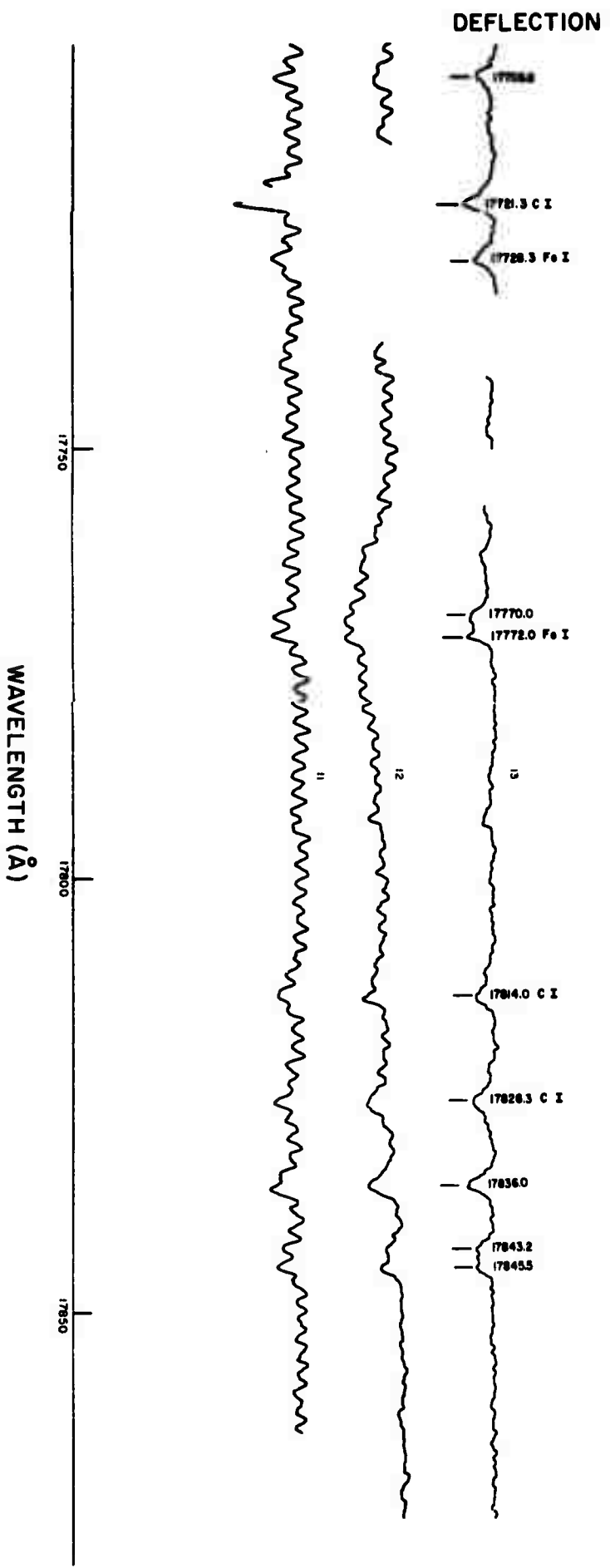


FIG 2 SEC 40

WAVELENGTH (Å)

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FIG 2 SEC 41

WAVELENGTH (Å)

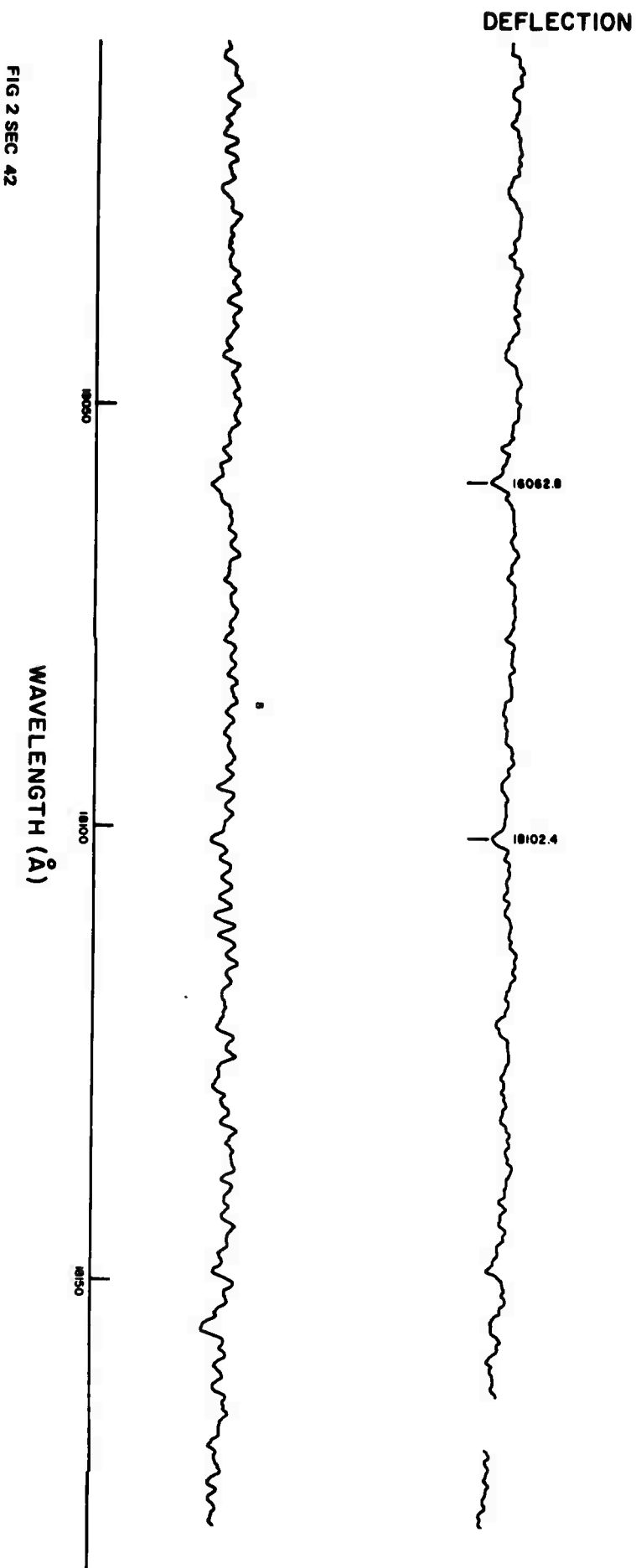
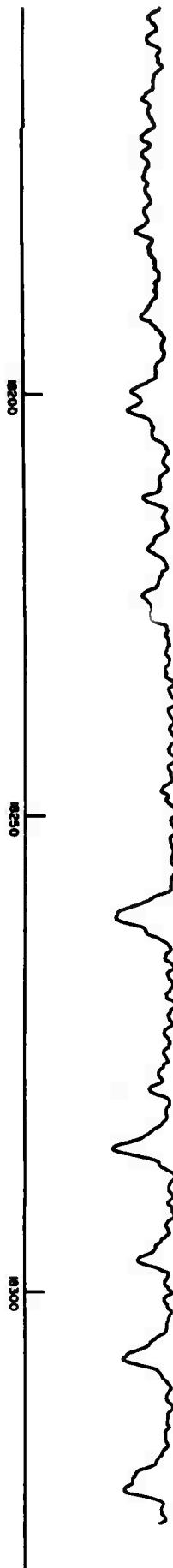


FIG 2 SEC 42

FIG 2 SEC 43

WAVELENGTH (Å)



DEFLECTION



FIG 2 SEC 44

WAVELENGTH (Å)

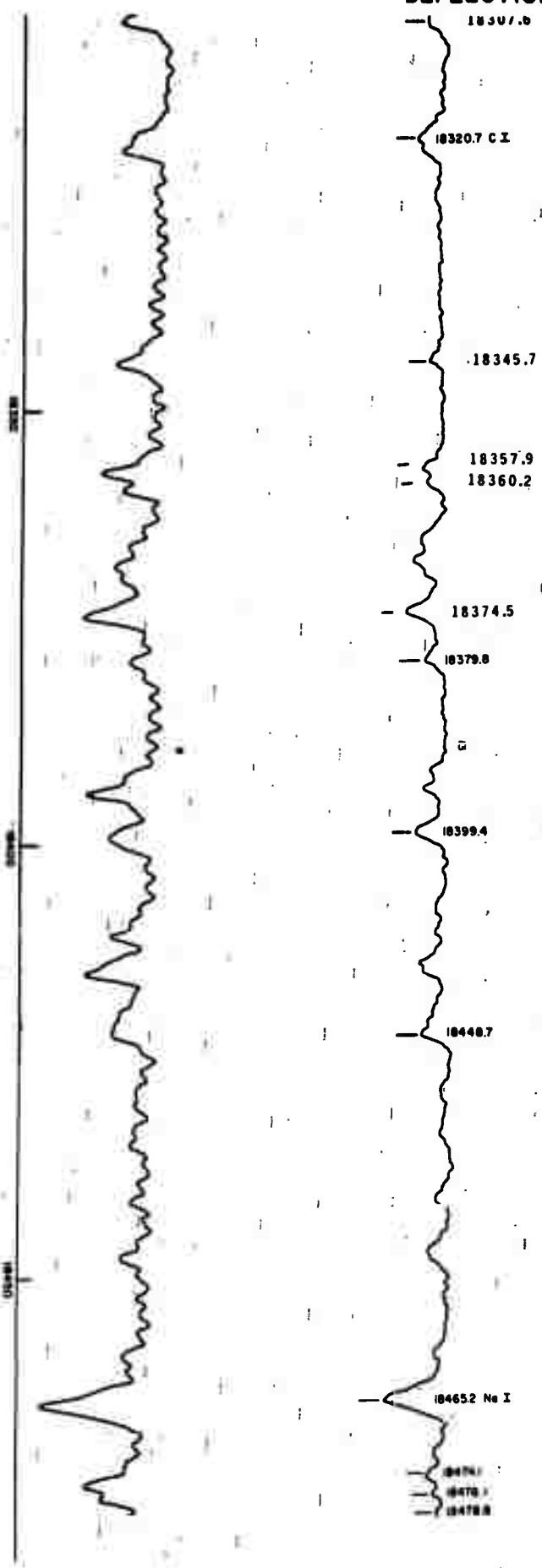
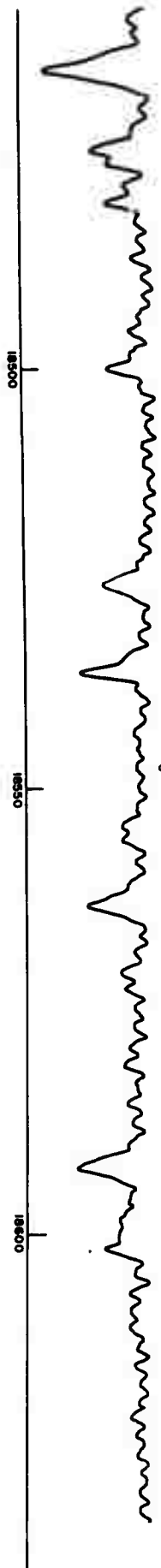
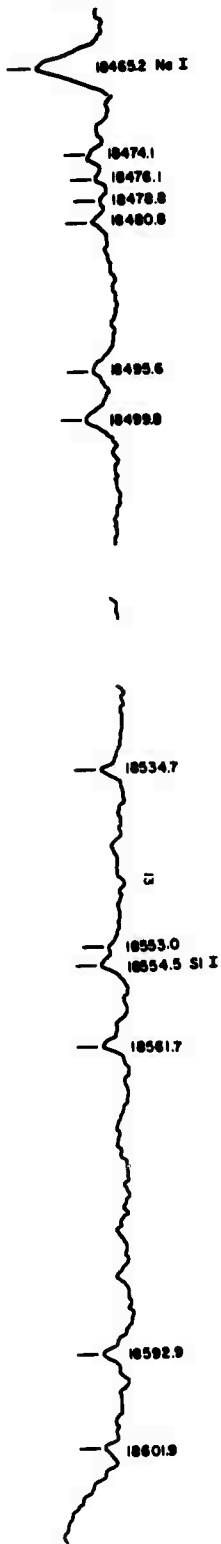


FIG 2 SEC 45

WAVELENGTH (Å)



DEFLECTION



DEFLECTION

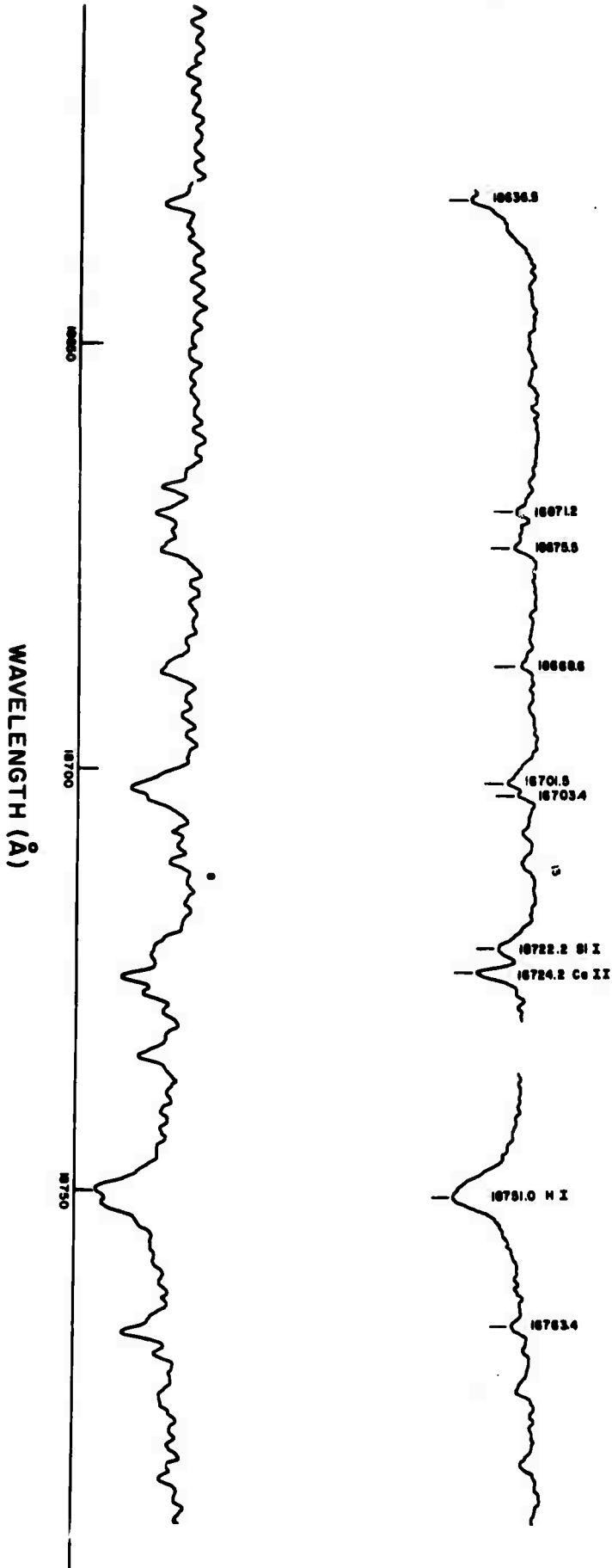


FIG 2 SEC 46

WAVELENGTH (Å)

DEFLECTION

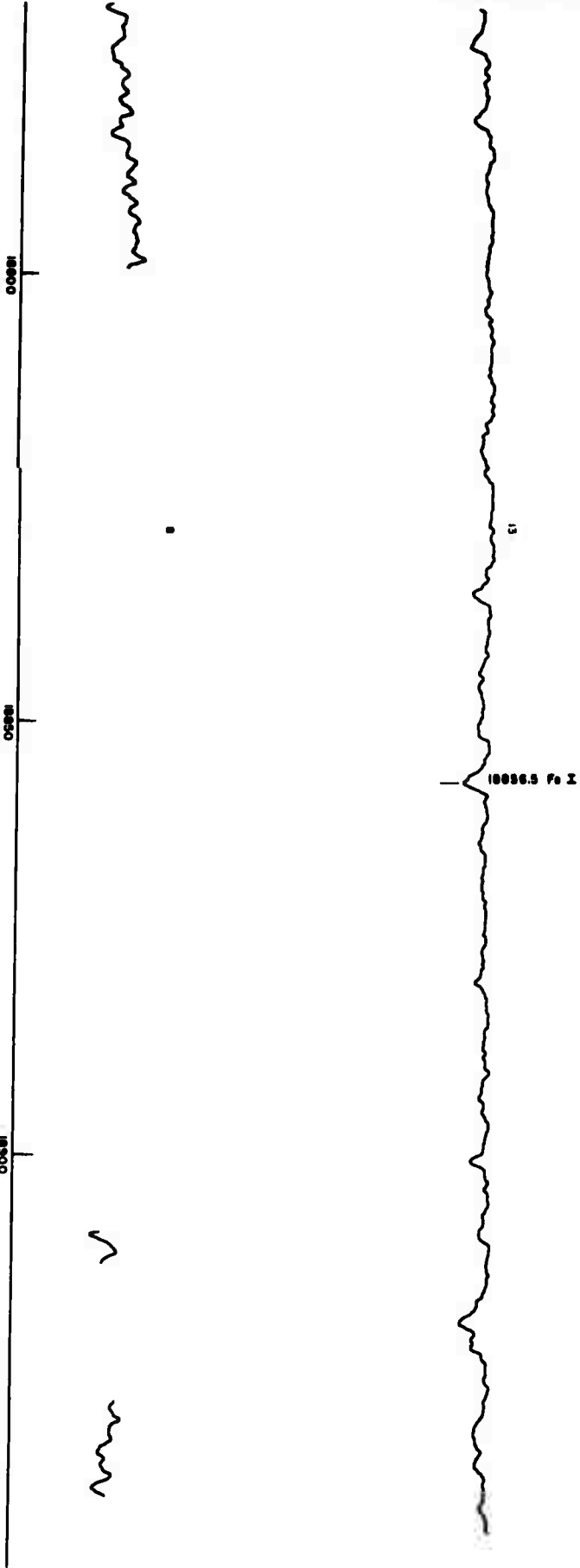


FIG 2 SEC 47

WAVELENGTH (Å)

DEFLECTION



WAVELENGTH (Å)

FIG 2 SEC 48

TABLE I

Times and Altitudes for the Selected Records Shown in Figures 1-2.

Record No.	Time (MST)	Altitude(kf)
7	7:28 - 7:46	24.5 - 36.5
8	7:46 - 8:04	36.5 - 52.0
9	8:04 - 8:22	52.0 - 62.0
11	8:40 - 8:58	75.3 - 87.0
12	8:58 - 9:16	87.0 - 96.0
13	9:16 - 9:34	96.0 - 96.3
14	9:34 - 9:52	96.3 - 96.3