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PRIMARY PRODUCTION AND RELATED MEASUREMENTS AT A FIXED
STATION IN THE CARIBBEAN SEA IN DECEMBER 1984

by

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Abstract

Irwin, B., Caverhill, C., Anning, J. and Platt, T. 1987. Primary production and related measurements at a fixed station in the Caribbean Sea in December 1984. Can. Data Rep. Fish. Aquat. Sci. No. 671: iv + 161 p.

During the period 2 December to 6 December 1984, primary production and other related measurements were measured at a station in the Caribbean Sea. In this report we make available the raw data and some fitted parameters.

Résumé

Irwin, B., Caverhill, C., Anning, J. and Platt, T. 1987. Primary production and related measurements at a fixed station in the Caribbean Sea in December 1984. Can. Data Rep. Fish. Aquat. Sci. No. 671: iv + 161 p.

Pendant la période du 2 décembre au 6 décembre 1984, la production primaire et plusieurs autres variables ont été mesurée à une station située dans la mer Caribe. Dans ce rapport nous présentons les données brutes ainsi que les paramètres calculés.

Contents

Abstract/Résumé	iii
Introduction	1
Sampling	1
Methods	1
Productivity	1
Chlorophyll a	2
Organic Particulates	2
Nutrients	3
Incubation and Incident Light	3
Estimation of Photosynthetic Parameters	3
Acknowledgements	3
References	4

Introduction

This is the third in a series of data reports giving the results of primary productivity experiments and related nutrient measurements at stations in the open ocean which were occupied for several consecutive days. For this experiment a station was chosen in the Eastern Caribbean some 200 nautical miles west of the Lesser Antilles and equidistant from the Antilles and the South American mainland (Fig. 1). This station was occupied from 2 to 6 December inclusive. A series of free-drifting sediment traps were deployed in the afternoon of 2 December and recovered in the evening of 6 December.

On the transect to Halifax, one station per day was occupied except for two days off Chesapeake Bay when two stations were occupied. This was part of a remote sensing experiment.

This was an international multidiscipline cruise on CSS Hudson coordinated by the Biological Oceanography group of the Biological Sciences Branch of the Bedford Institute of Oceanography.

Sampling

All samples for *in situ* profiles were collected with 30 l niskin bottles. Sampling depths were standard oceanographic depths. All other samples were collected with a modified continuous pump sampler (Irwin *et al.* 1985).

Methods

Productivity

Primary productivity was measured using the ^{14}C method and the oxygen evolution method. The ^{14}C method was essentially as described by Strickland and Parsons (1972). For light saturation experiments 50 pci of sodium bicarbonate ^{14}C was added to 100 mls of sample. Forty-two light bottles and 2 dark bottles were filled for each light saturation experiment. Incubations were done in temperature

controlled incubators illuminated by 250 w tungsten halogen lamps (Gilway Technical Lamp L7391). Incubation times were usually three hours.

For *in situ* experiments, the ^{14}C method and oxygen evolution method were both used. Fifty μci ^{14}C was added to each of 3 light and 2 dark bottles from each depth for each experiment for whole carbon samples and 100 μci for size fractioned carbon samples. Size fractions were the fraction captured on a 1.0 μm Nuclepore filter and the fraction passing through a 1.0 μm Nuclepore and captured on a Whatman GF/F filter. Whole samples were filtered onto Whatman GF/F filters.

For oxygen experiments 3 light, 2 dark and 3 time zero bottles were filled at each depth. The time zero bottles were fixed immediately after filling. The dark bottles were incubated in a covered, temperature controlled incubator on deck. Oxygen and carbon bottles were redeployed at their respective depths and recovered 12 or 24 hours later. Bottles were deployed at sunrise and recovered at sunset or the following sunrise. Oxygen bottles were titrated using the micro-Winkler technique of Williams and Jenkinson (1982).

Chlorophyll a

Replicate 100 ml samples were filtered onto 25 mm Whatman GF/F glass fibre filters. Filters were then placed in 20 ml glass vials containing 10.0 mls of 85% acetone. Chlorophyll was extracted for 24 hours at 0°C in the dark. The fluorometric technique of Yentsch and Menzel (1963) as modified by Holm Hansen *et al.* (1965) was used to estimate chlorophyll and phaeophytin concentrations.

Organic Particulates

Samples for particulate organic carbon and nitrogen were filtered onto precombusted Whatman GF/F filters. Filters were stored frozen for later analysis in methods described in Irwin *et al.* (1982).

Nutrients

Three inorganic nutrients were routinely measured at all sampled depths. Samples were stored frozen for later analysis using methods described in Irwin *et al.* (1982).

Incubation and Incident Light

Light intensities in the incubators were measured with a 4Π quantum meter (Biospherical Instruments Model QSL 100). Incident total radiation was measured with a 40 junction black and white pyranometer (Eppley Laboratories Model 8-48) and Photosynthetically Active Radiation (PAR) with a quantum sensor (Licor model LI 190S). The output from both instruments was integrated each hour on a Licor Li 550 printing integrator.

Estimation of Photosynthetic Parameters

Measurements of specific production PB and irradiance I were used to estimate parameters in the equation of Platt *et al.* (1981).

$$P^B = P_s (1 - e^{-\alpha I/P_s}) e^{-\beta I/P_s}$$

P_s (mg C mg Chl⁻¹h⁻¹) is the light saturated rate of specific production in the absence of photoinhibition, α (mg C (mg Chl⁻¹)h⁻¹ w⁻¹ m⁻²) is the initial slope of the PI curve and β (same units as α) is a parameter that characterises photoinhibition. Complete details of the fitting routine are given in Irwin *et al.* (1982) and a discussion of the mathematical basis for this technique is in Irwin *et al.* (1980).

Acknowledgements

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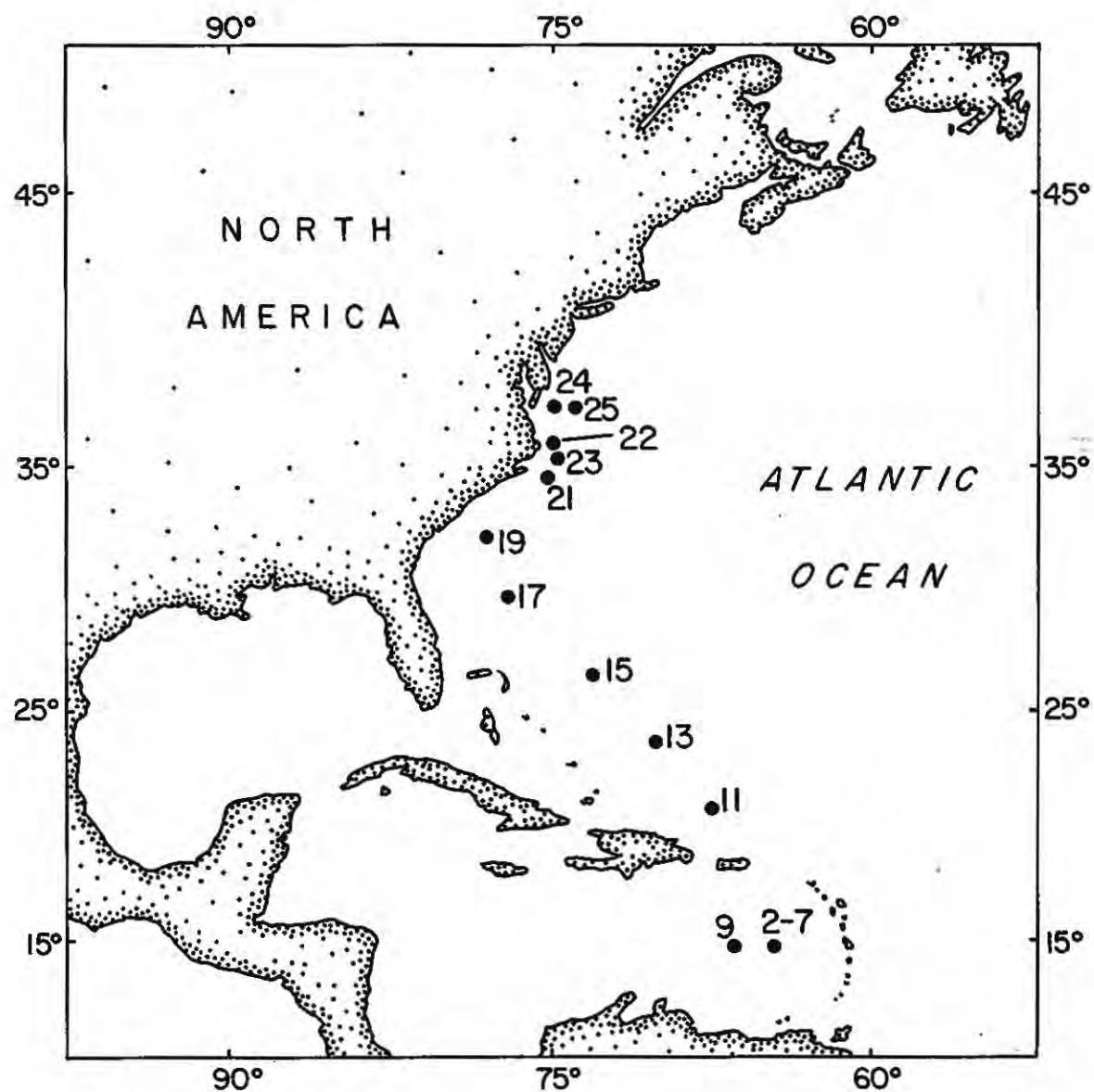


Fig. 1 Location of sampling station in the Caribbean Sea and transect stations to Halifax

Sediment Trap Data

SEDIMENT TRAPS

Deployed	15.00	02.12.84
Recovered	18.00	06.12.84
Duration	99.00 hours	

Depth m	POC			PON		
	Mg C	Mg C m ⁻²	Mg C m ⁻² d ⁻¹	Mg N	Mg N m ⁻²	Mg N m ⁻² d ⁻¹
84	11.51	841	204	2.16	158	38
134	6.99	511	124	0.94	69	17
234	9.46	691	168	1.01	74	18
384	3.41	332	56	0.38	37	9
984	2.14	156	38	0.12	9	2

In Situ Profiles

	Units
z	= depth in meters
P_w	= carbon production whole sample mg C m ⁻³ h ⁻¹
$P_{>1}$	= carbon production of fraction captured on 1.0 μm pore filters mg C m ⁻³ h ⁻¹
$P_{<1}$	= carbon production of fraction passing through 1.0 μm pore filter and captured on GF/F filter mg C m ⁻³ h ⁻¹
P_g	= gross oxygen production mg O ₂ m ⁻³ h ⁻¹
P_n	= net oxygen production mg O ₂ m ⁻³ h ⁻¹
P_r	= oxygen respiration mg O ₂ m ⁻³ h ⁻¹ NO ₃ , SiO ₃ , PO ₄ are in mg at m ⁻³ , chlorophyll, carbon nitrogen are in mg m ⁻³

BARBADOS 1984

LAT 14 40.0' N LONG 64 54.0' W				DATE 03/12/84				INCUB TIME 10.1 HRS			
Z	PW			O2			NO3	SiO3	PO4	CHL	CARBON NITROGEN
		P>1	P<1	PG	PN	PR					
5	.20	.14	.03	4.9	-4.4	9.4	.00	1.84	.00	.11	73
20	.18	.13	.05	4.8	-3.1	7.9	.00	1.88	.00	.11	43
40	.27	.20	.21	7.3	-16.6	23.9	.00	1.78	.00	.10	94
60	.26	.12	.20	1.5	-4.3	6.8	.00	.58	.00	.30	68
70	.16	.06	.11	-	-	-	.00	.38	.02	.28	58
75	-	-	-	4.7	-1.9	6.6	.00	.28	.00	.37	74
80	.10	.07	.08	3.9	-11.8	15.7	.00	.29	.00	.47	42
90	.25	.16	.12	.6	-11.4	11.9	.00	.19	.00	.41	96
110	.18	.06	.06	-	-	-	.83	.35	.00	.11	49
130	.01	.01	.01	-	-	-	1.37	.39	.00	.05	34

BARBADOS 1984

LAT 14 40.0' N LONG 64 54.0' W				DATE 03/12/84				INCUB TIME 23.4 HRS		
Z	PW	P>1	P<1	O2				CHL	CARBON	NITROGEN
				PG	PN	PR	NO3			
5	.11	.07	.02	2.4	-4.4	6.7	.00	1.84	.00	.11
20	.10	.07	.03	4.2	-6.3	10.4	.00	1.88	.00	.11
40	.12	.09	.06	2.4	-12.1	14.5	.00	1.78	.00	.10
60	.13	.05	.05	1.9	-2.9	4.8	.00	.58	.00	.30
70	-	.10	.07	1.7	-5.4	7.0	.00	.38	.02	.28
75	.15	.08	.08	2.1	-9.9	12.0	.00	.28	.00	.37
80	.10	.05	.08	.1	-7.9	8.0	.00	.29	.00	.47
90	.07	.06	.06	.0	-7.9	7.9	.00	.19	.00	.41
110	.07	.09	.04	.0	-5.3	5.3	.83	.35	.00	.11
130	.02	.00	.02	2.3	-1.8	4.1	1.37	.39	.00	.05

BARBADOS 1984

LAT	14 38.0' N	LONG	64 55.0' W	DATE	05/12/84	INCUB TIME	9.1 HRS		
Z	PW	P > 1	P < 1	NO3	SiO3	PO4	CHL	CARBON	NITROGEN
5	.70	.40	.21	.00	2.79	.10	.28	82	11
20	.71	.36	.35	.00	2.83	.06	.16	100	10
40	.40	.20	.23	.00	2.46	.29	.19	82	8
60	.33	.15	.17	.00	1.23	.19	.41	101	7
70	-	.14	.07	.00	.85	.13	.43	69	6
75	.23	.11	.13	.00	.66	.19	.40	94	4
80	.27	.11	.14	.00	.64	.18	.39	104	10
90	.27	.10	.15	.00	.43	.10	.38	81	27
110	.17	.06	.12	.62	.54	.16	.13	71	13
130	.08	.02	.06	1.39	.59	.22	.05	82	6

BARBADOS 1984

LAT	14 38.0' N	LONG	64 55.0' W	DATE	05/12/84	INCUB TIME	22.6 HRS		
Z	PW	P>1	P<1	NO3	SIO3	PO4	CHL	CARBON	NITROGEN
5	.36	.19	.13	.00	2.79	.10	.28	82	11
20	.27	.11	.15	.00	2.83	.06	.16	100	10
40	.21	.09	.09	.00	2.46	.29	.19	82	8
60	.15	.06	.08	.00	1.23	.19	.41	101	7
70	.13	.08	.05	.00	.85	.13	.43	69	6
75	.14	.08	.05	.00	.66	.19	.40	94	4
80	.12	.06	.05	.00	.64	.18	.39	104	10
90	.15	.08	.07	.00	.43	.10	.38	81	27
110	.14	.03	.05	.62	.54	.16	.13	71	13
130	.07	.03	.05	1.39	.59	.22	.05	82	6

Nutrient and Particulate Profiles

LAT. $14^{\circ}41'N$

DATE 2/12/84

LONG. $64^{\circ}50.8'W$

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
4	0.104	0.00	2.22	0.00	-	-
20	0.119	0.00	2.06	0.00	86.7	14.9
25	0.118	0.00	2.24	0.00	-	-
40	0.142	0.00	2.10	0.00	87.5	14.8
50	0.284	0.00	1.42	0.01	-	-
75	0.450	0.00	0.87	0.03	-	-

LAT. $14^{\circ}54'N$ LONG. $64^{\circ}50.8'W$

DATE 2/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
80	0.204	0.00	1.90	0.05	-	-
100	0.231	0.00	1.37	0.07	-	-
200	0.409	0.00	0.77	0.08	-	-
300	0.103	0.63	0.85	0.11	-	-
500	0.003	6.92	2.24	0.44	-	-
700	0.001	15.9	5.65	1.01	-	-
800	0.001	27.5	13.7	1.69	-	-
1000	0.001	33.2	24.4	2.12	-	-

LAT. $14^{\circ}41'N$ LONG. $64^{\circ}50.8'W$

DATE 3/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.105	0.00	1.84	0.00	73.1	10.1
20	0.106	0.00	1.88	0.00	43.5	7.5
30	0.131	0.00	2.14	0.12	105.7	13.3
40	0.095	0.00	1.78	0.00	94.5	20.6
60	0.302	0.00	0.58	0.00	57.8	4.4
70	0.275	0.00	0.38	0.02	57.8	3.6
75	0.371	0.00	0.28	0.00	73.9	7.9
80	0.473	0.00	0.29	0.00	42.1	8.3
90	0.406	0.00	0.19	0.00	96.3	9.9
110	0.110	0.83	0.35	0.00	49.2	8.6
130	0.046	1.37	0.39	0.0	33.6	3.82

LAT. $14^{\circ}40'N$ LONG. $64^{\circ}54'W$

DATE 3/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.117	0.00	2.11	0.07	-	-
10	0.117	0.00	2.12	0.07	-	-
20	0.127	0.00	2.11	0.07	-	-
30	0.129	0.00	2.10	0.06	-	-
40	0.142	0.00	2.04	0.07	-	-
60	0.355	0.00	1.12	0.06	-	-
75	0.364	0.00	0.65	0.06	-	-
85	0.305	0.15	0.60	0.11	-	-
114	0.069	1.30	0.80	0.15	-	-

LAT. $14^{\circ}4'N$ LONG. $64^{\circ}54'W$

DATE 3/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
25	0.088	0.00	2.02	0.08	-	-
50	0.322	0.00	1.17	0.12	98.8	7.8
70	0.382	0.00	0.61	0.12	86.2	7.2
100	0.130	0.70	0.77	0.12	-	-

LAT. $14^{\circ}40'N$ LONG. $64^{\circ}53'W$

DATE 4/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.219	0.00	1.71	0.09	-	-
10	0.235	0.00	2.45	0.07	-	-
20	0.213	0.00	2.09	0.07	-	-
30	0.228	0.00	2.41	0.08	-	-
40	0.287	0.00	2.41	0.08	-	-
65	0.364	0.00	0.72	0.10	-	-
80	0.521	0.00	0.53	0.09	-	-
95	0.281	0.26	0.54	0.10	-	-
105	0.100	0.92	0.62	0.12	-	-

LAT. $14^{\circ}38'N$

DATE 5/12/84

LONG. $64^{\circ}55'W$

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.275	0.00	2.79	0.10	81.8	11.1
20	0.155	0.00	2.83	0.06	99.6	9.5
40	0.189	0.00	2.46	0.29	82.2	8.4
60	0.411	0.00	1.23	0.19	101.3	6.9
70	0.432	0.00	0.85	0.13	69.5	5.7
75	0.402	0.00	0.66	0.19	93.5	3.9
80	0.387	0.00	0.64	0.18	104.3	10.4
90	0.384	0.00	0.43	0.10	81.2	26.5
110	0.126	0.62	0.54	0.16	71.3	12.6
130	0.049	1.39	0.59	0.22	82.4	6.2

LAT. $14^{\circ}38'N$

DATE 5/12/84

LONG. $64^{\circ}55'W$

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.272	0.00	2.68	0.00	240.0	22.5
10	0.266	0.00	2.73	0.00	85.6	8.7
20	0.239	0.00	2.71	0.00	-	-
40	0.310	0.00	2.64	0.00	-	-
55	0.435	0.00	1.58	0.01	-	-
60	0.406	0.00	1.44	0.00	-	-
70	0.502	0.00	1.19	0.02	-	-
85	0.443	0.00	0.79	0.05	-	-
110	0.198	0.34	0.50	0.08	-	-
115	0.079	0.84	0.59	0.08	-	-

LAT. $14^{\circ}38'N$ LONG. $65^{\circ}0'W$
DATE 6/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.269	0.00	4.21	0.00	-	-
10	0.287	0.00	4.17	0.01	-	-
20	0.337	0.00	4.07	0.01	120.5	7.9
40	0.472	0.00	2.18	0.02	-	-
55	0.420	0.00	1.48	0.02	62.7	7.3
60	0.453	0.00	1.46	0.07	-	-
70	0.432	0.00	1.27	0.05	97.4	9.2
85	0.337	0.00	1.00	0.04	75.6	8.5
100	0.102	0.00	1.11	0.02	86.7	10.6
113	0.094	0.51	0.88	0.02	-	-

LAT. $16^{\circ}44.5'N$ LONG. $66^{\circ}48.6'W$
DATE 7/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
20	0.101	0.00	2.91	0.01	80.2	12.1
55	0.112	0.00	2.86	0.04	64.7	3.7
75	0.284	0.00	1.03	0.05	67.7	6.3
90	0.379	0.00	1.05	0.07	100.0	7.2

LAT. 16°44.5'N

LONG. 66°48.6'W

DATE 7/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.091	0.00	2.90	0.12	-	-
10	0.098	0.00	2.92	0.12	-	-
20	0.083	0.00	3.00	0.15	-	-
30	0.094	0.00	3.11	0.14	-	-
40	0.100	0.00	3.16	0.00	-	-
50	0.101	0.00	3.11	0.00	-	-
55	0.095	0.00	2.99	0.01	-	-
60	0.254	0.00	1.47	0.01	-	-
70	0.266	0.00	1.22	0.03	-	-
75	0.233	0.00	1.07	0.03	-	-
80	0.352	0.00	1.05	0.05	-	-
90	0.379	0.44	1.10	0.06	-	-
100	0.352	0.69	1.08	0.09	-	-
113	0.177	0.81	1.04	0.14	-	-

LAT. $20^{\circ}40'N$

DATE 8/12/84

LONG. $67^{\circ}39.9'W$

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.059	0.32	0.59	0.00	80.6	6.7
10	0.056	0.00	0.65	0.03	117.0	10.7
20	0.056	0.00	0.78	0.00	86.4	8.7
30	0.061	0.00	0.58	0.00	42.3	4.8

LAT. $23^{\circ}38.5'N$

DATE 9/12/84

LONG. $70^{\circ}25'W$

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.071	0.00	0.43	0.04	-	-
10	0.072	0.02	0.63	0.00	-	-
20	0.088	0.04	0.62	0.00	-	-
30	0.072	0.06	0.37	0.00	-	-
40	0.069	0.08	0.57	0.00	-	-
50	0.069	0.20	0.50	0.00	-	-
60	0.072	0.24	0.63	0.00	-	-
70	0.074	0.17	0.59	0.00	-	-
80	0.096	0.13	0.50	0.00	-	-
90	0.006	0.11	0.53	0.00	-	-
110	0.010	0.09	0.43	0.00	-	-

LAT. 20°40'N

LONG. 67°39.9'W

DATE 8/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.060	0.00	0.78	0.00	-	-
10	0.055	0.00	0.97	0.00	-	-
20	0.056	0.00	0.84	0.00	-	-
30	0.060	0.00	0.89	0.01	-	-
40	0.060	0.00	0.69	0.00	-	-
50	0.060	0.00	0.83	0.00	-	-
65	0.107	0.00	0.95	0.00	-	-
75	0.097	0.00	0.96	0.00	-	-
85	0.141	0.00	0.92	0.00	-	-
90	0.222	0.00	0.77	0.00	-	-
95	0.259	0.00	0.78	0.00	-	-
100	0.321	0.00	0.91	0.00	-	-
113	0.278	0.00	0.68	0.01	-	-

LAT. $23^{\circ}38'N$ LONG. $70^{\circ}25'W$

DATE 9/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
10	0.073	0.00	0.36	0.00	65.2	10.3
20	0.078	0.00	0.31	0.06	42.8	8.8
30	0.073	0.00	0.31	0.07	74.0	4.3
40	0.067	0.00	0.57	0.06	102.5	5.1

LAT. $26^{\circ}41.6'N$ LONG. $73^{\circ}39.4'W$

DATE 10/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.110	0.38	1.34	0.03	-	-
10	0.107	0.38	1.35	0.01	-	-
20	0.104	0.00	0.10	0.00	-	-
30	0.110	0.00	0.09	0.00	-	-
40	0.112	0.00	0.16	0.00	-	-
50	0.104	0.00	0.03	0.00	-	-
60	0.106	0.00	0.00	0.00	-	-
70	0.157	0.00	0.00	0.00	-	-
80	0.112	0.00	0.04	0.00	-	-
90	0.112	0.00	0.01	0.00	-	-
100	0.302	0.00	0.00	0.00	-	-
110	0.235	0.00	0.00	0.00	-	-

LAT. $26^{\circ}41.6'N$

DATE 10/12/84

LONG. $73^{\circ}39.4'W$

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.113	0.00	0.53	0.18	81.1	7.1
10	0.111	0.00	0.53	0.13	73.3	5.3
20	0.115	0.00	0.50	0.14	60.5	7.9
30	0.105	0.00	0.56	0.25	69.5	6.5

LAT. $29^{\circ}50'N$

DATE 11/12/84

LONG. $77^{\circ}18.9'W$

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.236	0.00	0.28	0.04	-	-
10	0.236	0.03	0.31	0.02	-	-
20	0.242	0.02	0.24	0.00	-	-
30	0.248	0.08	0.24	0.02	-	-
40	0.239	0.08	0.30	0.02	-	-
50	0.248	0.10	0.39	0.02	-	-
60	0.245	0.00	0.33	0.00	-	-
70	0.242	0.00	0.41	0.00	-	-
80	0.244	0.00	0.49	0.04	-	-
90	0.245	0.00	0.33	0.05	-	-
100	0.228	0.00	0.28	0.06	-	-
115	0.072	0.00	0.25	0.14	-	-

LAT. $29^{\circ}50'N$ LONG. $77^{\circ}18.9'W$

DATE 11/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.245	0.08	0.76	0.00	40.1	12.4
10	0.236	0.01	0.74	0.00	66.7	3.6
20	0.242	0.00	0.90	0.03	66.5	6.3
30	0.242	0.01	0.29	0.03	39.0	4.9

LAT. $32^{\circ}10.9'N$ LONG. $78^{\circ}14.4'W$

DATE 12/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.382	0.02	1.04	0.06	-	-
10	0.367	0.11	1.13	0.12	-	-
20	0.370	0.54	0.87	0.00	-	-
40	0.399	0.51	0.87	0.00	-	-
60	0.379	0.50	0.95	0.05	-	-
80	0.382	0.27	1.06	0.08	-	-
100	0.355	0.80	1.34	0.04	-	-
115	0.053	3.08	1.86	0.13	-	-

LAT. $32^{\circ}10.9'N$ LONG. $78^{\circ}14.4'W$
DATE 12/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.393	0.01	1.10	0.00	82.3	9.2
10	0.393	0.03	1.11	0.00	67.6	17.8
20	0.408	0.01	1.06	0.00	83.8	12.0
30	0.382	0.04	1.08	0.04	97.3	17.1

LAT. $33^{\circ}21'N$ LONG. $75^{\circ}39.6'W$
DATE 13/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.343	0.09	1.46	0.00	-	-
10	0.367	0.05	1.42	0.00	-	-
20	0.349	0.02	1.39	0.00	-	-
40	0.364	0.03	1.35	0.00	-	-
60	0.355	0.00	1.31	0.00	-	-
80	0.331	0.15	1.21	0.00	-	-
100	0.043	2.35	1.64	0.04	-	-
114	0.044	3.43	1.98	0.05	-	-

LAT. $34^{\circ}21'N$ LONG. $75^{\circ}39.6'W$

DATE 13/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.370	0.02	1.61	0.00	36.5	12.5
10	0.358	0.06	1.64	0.00	52.3	8.0
20	0.359	0.11	1.57	0.00	50.6	13.2
40	0.355	0.07	1.51	0.00	65.5	8.1

LAT. $35^{\circ}37.1'N$ LONG. $75^{\circ}13.5'W$

DATE 14/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	2.14	0.00	0.82	0.05	169.0	23.1
10	2.28	0.00	0.81	0.07	-	-
15	2.02	0.02	0.84	0.05	156.0	20.9
20	2.14	0.05	0.90	0.06	-	-
25	2.56	0.02	0.99	0.00	-	-
30	4.83	0.19	2.07	0.11	-	-

LAT. $35^{\circ}17.9'N$ LONG. $74^{\circ}42.2'W$
DATE 14/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.500	0.12	0.33	0.04	-	-
10	0.456	0.17	0.33	0.19	-	-
20	0.485	0.10	0.37	0.27	-	-
30	0.511	0.05	1.10	0.12	-	-
40	0.476	0.06	1.04	0.07	-	-
50	0.450	0.09	1.06	0.22	-	-
60	0.482	0.05	1.14	0.22	-	-
70	0.231	0.54	1.37	0.00	-	-
80	0.230	0.21	1.44	0.00	-	-
90	0.197	0.26	1.49	0.00	-	-
100	0.195	0.37	1.54	0.00	-	-
115	0.228	0.43	1.81	0.00	-	-

LAT. $35^{\circ}17.9'N$ LONG. $74^{\circ}42.2'W$
DATE 14/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	0.467	0.14	0.34	0.01	83.4	44.1
50	0.439	0.00	0.28	0.00	61.9	5.6

LAT. 36°54.5'N

LONG. 74°49'W

DATE 15/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	1.89	2.56	1.57	0.33	117.0	15.9
10	1.87	2.25	1.35	0.30	115.0	21.0
15	1.71	2.68	1.54	0.34	-	-
20	1.79	2.56	1.58	0.30	-	-
25	1.75	2.75	1.61	0.35	-	-
30	2.17	2.68	1.63	0.24	-	-
35	2.17	2.67	1.54	0.18	-	-
40	2.20	2.77	1.50	0.26	-	-
45	1.83	2.79	1.54	0.22	-	-
50	1.78	2.82	1.45	0.38	-	-

LAT. 36°54.5'N

LONG. 74°11.7'W

DATE 15/12/84

DEPTH M	CHL mg m ⁻³	NO ₃ mg at m ⁻³	SiO ₃ mg at m ⁻³	PO ₄ mg at m ⁻³	CARBON mg m ⁻³	NITROGEN mg m ⁻³
5	1.35	1.90	2.31	0.21	119.0	65.1
10	1.59	1.49	0.94	0.14	-	-
20	1.63	1.82	2.13	0.27	116.0	65.9
30	1.50	2.12	1.35	0.22	-	-
40	1.14	2.72	1.40	0.23	-	-
50	0.67	2.95	1.05	0.22	-	-
60	1.22	2.67	0.90	0.21	-	-
70	1.14	1.75	1.11	0.21	-	-
80	0.45	3.61	1.52	0.32	-	-
90	0.44	5.25	2.12	0.39	-	-
100	0.38	8.22	3.66	0.44	-	-
115	0.34	10.4	4.54	0.65	-	-

Light Saturation Data and Related Biomass and Nutrient Data

	Units
P	= mg C (mg Chl ⁻¹) m ⁻³ h ⁻¹
I	= W m ⁻²
P _s	= mg C (mg Chl) ⁻¹ h ⁻¹
a	= mg C (mg Chl) ⁻¹ h ⁻¹ w ⁻¹ m ⁻²
β	= mg C (mg Chl) ⁻¹ h ⁻¹ w ⁻¹ m ⁻²

Organic particulates are in mg m⁻³. Inorganic nutrients are in mg at m⁻³. The 90% confidence interval for P_s, a, β are shown in the closed brackets below the estimates for each parameter.

BARBADOS 1984

LAT	14 41.0' N	LONG	64 50.8' W	DATE	02/12/84	DEPTH	40 M
I	P	I	P	I	P	I	P
646	.34	586	.15	466	.14	419	.56
399	.62	363	.44	331	.71	251	.74
211	.91	163	1.09	159	1.03	151	1.04
132	1.48	69	1.34	57	1.28	53	1.28
45	1.52	37	1.50	30	.77	23	.54
22	.74	18	.48	16	.69	11	.52
10	.47	6	.30	6	.28	4	.25
3	.21	3	.15				

PARAMETER VALUES

PS :	2.24	ALPHA :	.052	BETA :	.0090
(	1.89, 2.60 )	(	.047, .057 )	(	.0061, .0118)

SAMPLE TEMP	27.7 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL	: .14	NITRATE	: .00
CARBON	: 87	SILICATE	: 2.10
NITROGEN	: 14	PHOSPHATE	: .00

BARBADOS 1984

LAT	14 41.0' N	LONG	64 50.8' W	DATE	02/12/84	DEPTH	20 M
I	P	I	P	I	P	I	P
805	.94	678	1.04	439	1.33	359	1.32
283	1.33	203	1.36	183	1.11	144	1.27
136	1.29	106	1.01	65	.96	49	.88
45	1.04	41	.54	32	1.01	29	.63
24	.84	22	.77	13	.50	25	.46
7	.24	7	.27	6	.39	5	.29
3	.10	3	.17	3	.12	2	.11
2	.19	1	.08				

PARAMETER VALUES

PS :	1.27	ALPHA :	.042	BETA :	.0003
(1.18, 1.36)	(.037, .046)	(.0000, .0005)

SAMPLE TEMP	27.7 C	INCUBATION TEMP	26.5 C
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CHLOROPHYLL :	.12	NITRATE :	.00
CARBON :	86	SILICATE :	2.06
NITROGEN :	14	PHOSPHATE :	.00

BARBADOS 1984

LAT	14 40.0' N	LONG	64 54.0' W	DATE	03/12/84	DEPTH	60 M
I	P	I	P	I	P	I	P
805	.66	678	.64	439	1.16	423	.64
407	1.43	359	1.25	283	1.58	255	1.62
243	2.08	203	2.05	183	2.09	144	2.09
144	2.01	106	2.24	100	2.00	96	2.01
79	2.08	65	1.71	61	2.06	49	1.79
45	1.18	41	1.32	32	1.28	29	.82
24	1.17	22	1.20	13	.81	13	.63
79	.58	29	.71	7	.56	16	.34
24	.35	3	.26	3	.19	3	.13
79	.03	2	.08	2	.08	1	.01

PARAMETER VALUES

PS :	3.28	ALPHA :	.056	BETA :	.0081
(	2.95, 3.62 )	(	.052, .060 )	(	.0062, .0100)

SAMPLE TEMP	27.0 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.38	NITRATE :	.00
CARBON :	90	SILICATE :	1.15
NITROGEN :	12	PHOSPHATE :	.07

BARBADOS 1984

LAT	14 40.0' N	LONG	64 54.0' W	DATE	03/12/84	DEPTH	30 M
I	P	I	P	I	P	I	P
646	4.80	586	5.35	466	6.52	419	5.43
399	5.96	331	6.33	271	5.55	251	6.42
211	6.52	187	6.82	163	6.54	159	6.40
151	6.46	114	6.10	104	5.30	69	5.18
57	4.16	53	5.13	45	4.16	37	3.31
34	3.22	30	2.00	23	1.84	22	2.15
16	1.19	12	1.02	11	.83	10	.71
9	.42	6	.47	5	.36	5	.28
4	.23	4	.37	3	.09	3	.23

PARAMETER VALUES

PS : 7.98	ALPHA : .116	BETA : .0058
(7.47, 8.50)	(.109, .122)	(.0041, .0074)

SAMPLE TEMP	27.0 C	INCUBATION TEMP	26.5 C
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CHLOROPHYLL :	.13	NITRATE :	.00
CARBON :	105	SILICATE :	2.14
NITROGEN :	13	PHOSPHATE :	.12

BARBADOS 1984

LAT	14 43.0' N	LONG	64 54.0' W	DATE	03/12/84	DEPTH	70 M
I	P	I	P	I	P	I	P
466	.08	399	.17	331	.22	271	.24
251	.30	211	.31	187	.24	163	.35
159	.42	151	.37	114	.40	57	.43
53	.43	45	.43	34	.31	23	.42
18	.40	16	.39	10	.25	9	.29
6	.21	5	.16	5	.15	4	.18
4	.07	3	.11	3	.10	2	.05

PARAMETER VALUES

PS :	.50	ALPHA :	.042	BETA :	.0013
(	.47, .53 )	(	.038, .046 )	(	.0010, .0016)

SAMPLE TEMP	26.2 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.38	NITRATE :	.00
CARBON :	86	SILICATE :	.61
NITROGEN :	7	PHOSPHATE :	.12

BARBADOS 1984

LAT	14 43.0' N	LONG	64 54.0' W	DATE	03/12/84	DEPTH	50 M
I	P	I	P	I	P	I	P
805	.16	678	.07	423	.31	407	.46
359	.44	243	.49	203	.50	144	.62
106	.70	100	.61	96	.67	79	.70
65	.60	45	.35	41	.62	32	.44
29	.43	24	.37	22	.28	13	.25
13	.29	9	.12	7	.18	5	.15
3	.06	1	.01				

PARAMETER VALUES

PS : .92 ALPHA : .021 BETA : .0022
 (.82, 1.03) (.019, .023) (.0016, .0028)

SAMPLE TEMP 27.5 C INCUBATION TEMP 26.5 C

CHLOROPHYLL :	.32	NITRATE :	.00
CARBON :	98	SILICATE :	1.17
NITROGEN :	7	PHOSPHATE :	.12

BARBADOS 1984

LAT	14 40.0' N	LONG	64 53.0' W	DATE	04/12/84	DEPTH	80 M
I	P	I	P	I	P	I	P
646	.00	466	.03	419	.03	399	.18
271	.23	163	.43	151	.46	132	.37
114	.40	102	.33	30	.46	18	.48
16	.47	12	.47	11	.41	6	.17
6	.44	5	.29	4	.11	3	.06
3	.16	2	.19				

PARAMETER VALUES

PS :	.61	ALPHA :	.065	BETA :	.0024
(.53, .70)		(.054, .076)		(.0015, .0032)	

SAMPLE TEMP	26.5 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.50	NITRATE :	.00
CARBON :	-	SILICATE :	.65
NITROGEN :	-	PHOSPHATE :	.13

BARBADOS 1984

LAT 14 40.0' N		LONG 64 53.0' W		DATE 04/12/84		DEPTH	80 M
I	P	I	P	I	P	I	P
678	.04	439	.12	407	.21	359	.15
283	.30	255	.30	144	.41	144	.38
136	.41	106	.44	96	.41	79	.48
65	.49	61	.44	45	.45	41	.43
32	.35	29	.41	24	.38	22	.32
13	.36	13	.36	9	.28	9	.28
7	.25	5	.27	2	.23	1	.18

48

PARAMETER VALUES

PS : .51	ALPHA : .050	BETA : .0012
(.47, .54)	(.043, .057)	(.0009, .0015)

SAMPLE TEMP 26.5 C	INCUBATION TEMP 26.5 C
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CHLOROPHYLL : .23	NITRATE : .00
CARBON : -	SILICATE : .65
NITROGEN : -	PHOSPHATE : .13

BARBADOS 1984

LAT	14 38.0' N	LONG	64 55.0' W		DATE	05/12/84	DEPTH	5 M
I	P	I	P	I	P	I	P	
646	3.30	586	3.06	466	2.86	419	2.95	
363	3.78	331	3.35	271	3.22	211	4.42	
187	3.99	159	3.95	151	4.08	114	3.70	
104	4.05	102	3.72	69	3.33	57	3.34	
53	3.45	45	2.90	37	2.86	34	2.03	
30	2.17	23	1.02	22	1.32	18	1.50	
16	1.56	12	.34	11	.48	10	.51	
9	.48	6	.18	6	.24	5	.22	
5	.05	3	.01	3	.03			

PARAMETER VALUES

PS : 4.84	ALPHA : .091	BETA : .0042
(4.46, 5.22)	(.085, .099)	(.0028, .0056)

SAMPLE TEMP	27.6 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL	: .27	NITRATE	: .00
CARBON	: 239	SILICATE	: 2.68
NITROGEN	: 22	PHOSPHATE	: .00

BARBADOS 1984

LAT	14 38.0' N	LONG	64 55.0' W	DATE	05/12/84	DEPTH	10 M
I	P	I	P	I	P	I	P
805	2.75	678	3.79	439	3.02	423	3.88
407	3.37	359	4.08	283	3.62	255	4.07
243	3.49	203	4.13	183	4.40	144	4.40
136	4.69	106	4.34	100	4.33	96	4.21
79	4.08	65	3.81	61	3.55	49	2.90
45	3.25	41	2.78	32	2.27	29	2.63
24	1.75	22	1.36	13	1.32	13	.99
9	.66	9	.55	7	.42	7	.53
6	.61	5	.37	3	.28	3	.42
3	.24	2	.14	2	.09	2	.32
1	.25						

PARAMETER VALUES

PS :	4.98	ALPHA :	.108	BETA :	.0036
(	4.74, 5.21 )	(	.101, .114 )	(	.0028, .0044)

SAMPLE TEMP 27.6 C INCUBATION TEMP 26.5 C

CHLOROPHYLL :	.27	NITRATE :	.00
CARBON :	85	SILICATE :	2.73
NITROGEN :	8	PHOSPHATE :	.00

BARBADOS 1984

LAT	14 38.0' N	LONG	65 .0' W	DATE	06/12/84	DEPTH	40 M
I	P	I	P	I	P	I	P
646	.95	586	.48	466	1.39	419	1.57
399	1.73	363	1.99	331	1.59	271	1.93
251	2.33	211	1.79	187	2.38	163	2.30
159	2.13	132	2.07	114	1.98	104	1.79
102	2.25	69	2.22	53	1.50	45	1.67
34	1.78	30	1.67	22	1.71	12	.90
11	.70	10	1.16	9	.57	6	.39
6	.29	5	.20	5	.70	4	.13
4	.12	3	.20	3	.22	2	.12

51

PARAMETER VALUES

PS :	2.67	ALPHA :	.084	BETA :	.0038
(	2.46, 2.88 )	(	.074, .094 )	(	.0027, .0048)

SAMPLE TEMP	-	INCUBATION TEMP	26.5 C
CHLOROPHYLL	: .47	NITRATE	: .00
CARBON	: -	SILICATE	: 2.18
NITROGEN	: -	PHOSPHATE	: .02

BARBADOS 1984

LAT	14 38.0' N	LONG	65 .0' W	DATE	06/12/84	DEPTH	60 M
I	P	I	P	I	P	I	P
805	.71	678	.68	439	.74	423	1.08
407	1.07	359	1.03	283	1.18	183	1.26
144	1.27	136	1.36	106	1.33	96	1.32
79	1.34	61	1.26	49	1.06	45	1.24
29	1.15	24	1.07	22	.88	99	.63
7	.31	6	.14	5	.11	32	.18
3	.22	3	.00	2	.11	2	.07

52

PARAMETER VALUES

PS :	1.51	ALPHA :	.062	BETA :	.0016
(	1.44, 1.57 )	(	.057, .068 )	(	.0013, .0018)

SAMPLE TEMP	-	INCUBATION TEMP	26.5 C
CHLOROPHYLL	: .45	NITRATE	: .00
CARBON	: -	SILICATE	: 1.46
NITROGEN	: -	PHOSPHATE	: .07

BARBADOS 1984

LAT	16 44.5' N	LONG	66 48.6' W	DATE	07/12/84	DEPTH	90 M
I	P	I	P	I	P	I	P
235	.10	231	.00	207	.21	167	.61
163	.21	82	.99	72	1.11	38	.75
31	.94	21	.70	17	.92	14	.53
11	.64	11	.53	7	.54	7	1.04
5	.26	5	.41	3	.20	2	.05
2	.45	2	.04				

PARAMETER VALUES

PS : 2.05	ALPHA : .076	BETA : .0212
(1.06, 3.03)	(.062, .089)	(.0034, .0390)

SAMPLE TEMP	25.3 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.38	NITRATE :	.00
CARBON :	100	SILICATE :	1.05
NITROGEN :	7	PHOSPHATE :	.07

BARBADOS 1984

LAT 16 44.5' N		LONG 66 48.6' W		DATE 07/12/84		DEPTH 75 M	
I	P	I	P	I	P	I	P
315	.27	255	.29	227	.58	179	.63
179	.51	148	.74	128	.86	116	.66
100	.91	90	.75	74	.64	64	.93
63	.87	61	.77	41	.90	33	.69
11	.55	9	.28	8	.43	6	.51
6	.50	5	.26	4	.40	3	.25
2	.15	2	.24	2	.78		

PARAMETER VALUES

PS : 1.00	ALPHA : .092	BETA : .0031
(.88, 1.13)	(.074, .110)	(.0017, .0045)

SAMPLE TEMP 26.7 C	INCUBATION TEMP 26.5 C
CHLOROPHYLL : .28	NITRATE : .00
CARBON : 67	SILICATE : 1.03
NITROGEN : 6	PHOSPHATE : .05

BARBADOS 1984

LAT	16 44.5' N	LONG	66 48.6' W	DATE	07/12/84	DEPTH	55 M
	P		P		P		P
698	1.34	566	3.01	458	.84	391	1.08
347	.73	303	1.45	283	2.01	235	1.42
231	4.57	207	3.89	106	4.57	46	2.17
38	3.59	31	1.33	29	4.16	25	2.07
17	3.19	14	2.43	11	.66	11	2.21
7	.13	7	.43	7	.63	5	.21
3	.06	2	.31				

PARAMETER VALUES

PS : 5.95	ALPHA : .143	BETA : .0192
(3.46, 8.45)	(.108, .177)	(.0025, .0358)

SAMPLE TEMP 27.2 C	INCUBATION TEMP 26.5 C
CHLOROPHYLL : .11	NITRATE : .00
CARBON : 64	SILICATE : 2.86
NITROGEN : 3	PHOSPHATE : .04

BARBADOS 1984

LAT	16 44.5' N	LONG	66 48.6' W	DATE	07/12/84	DEPTH	20 M
I	P	I	P	I	P	I	P
367	2.14	339	1.90	315	2.44	100	1.44
90	2.46	74	1.22	64	1.04	63	1.40
61	1.55	51	2.82	41	1.93	37	2.15
33	1.86	14	1.72	11	1.12	9	2.23
8	1.49	6	.88	4	.80	2	.59
2	.74						

95

PARAMETER VALUES

PS : 1.87	ALPHA : .344	BETA : .0000
(1.68, 2.06)	(.230, .457)	(-.0011, .0011)

SAMPLE TEMP	27.2 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.10	NITRATE :	.00
CARBON :	80	SILICATE :	2.91
NITROGEN :	12	PHOSPHATE :	.01

BARBADOS 1984

LAT	20 40.0' N	LONG	67 39.9' W	DATE	08/12/84	DEPTH	30 M
I	P	I	P	I	P	I	P
690	5.50	618	2.63	427	4.38	375	4.19
319	5.72	118	4.88	112	4.36	98	4.50
81	5.71	77	3.44	69	3.60	54	5.60
30	2.94	23	3.50	16	3.03	9	2.17
7	3.31	5	2.90	4	2.60	4	3.39
4	1.95	3	2.48	2	1.65	2	1.25

57

PARAMETER VALUES

PS : 4.39	ALPHA : .489	BETA : .0000
(4.00, 4.79)	(.367, .610)	(-.0012, .0012)

SAMPLE TEMP	26.2 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.06	NITRATE :	.00
CARBON :	42	SILICATE :	.58
NITROGEN :	4	PHOSPHATE :	.00

BARBADOS 1984

LAT	20 40.0' N	LONG	67 39.9' W	DATE	08/12/84	DEPTH	20 M
I	P	I	P	I	P	I	P
666	4.97	407	4.36	331	4.95	287	4.25
271	3.97	251	4.59	243	4.81	163	3.39
132	4.65	128	4.17	110	3.06	94	3.16
81	2.45	75	1.92	62	3.11	51	2.02
48	2.05	37	1.68	30	2.38	25	1.82
16	1.73	5	1.08	5	1.35	4	.63
2	.04						

85

PARAMETER VALUES

PS : 4.57	ALPHA : .063	BETA : .0000
(3.85, 5.30)	(.054, .072)	(-.0018, .0018)

SAMPLE TEMP	26.2 C	INCUBATION TEMP	26.5 C
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CHLOROPHYLL :	.06	NITRATE :	.00
CARBON :	86	SILICATE :	.78
NITROGEN :	8	PHOSPHATE :	.00

BARBADOS 1984

LAT	20 40.0' N	LONG	67 39.9' W	DATE	08/12/84	DEPTH	10 M
I	P	I	P	I	P	I	P
690	4.16	618	3.92	546	4.82	427	4.67
375	3.43	327	4.88	319	4.45	307	4.42
207	4.37	183	4.98	120	4.22	118	3.60
112	4.24	81	3.21	77	3.16	40	1.63
37	1.14	30	2.23	16	.74	14	1.05
5	.84	4	.08	3	.97	2	.82
2	.26						

PARAMETER VALUES

PS : 5.16	ALPHA : .068	BETA : .0018
(4.49, 5.83)	(.059, .076)	(.0001, .0034)

SAMPLE TEMP	26.2 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.06	NITRATE :	.00
CARBON :	116	SILICATE :	.65
NITROGEN :	10	PHOSPHATE :	.03

BARBADOS 1984

LAT	20 40.0' N	LONG	67 39.9' W	DATE	08/12/84	DEPTH	5 M
	P		P		P		P
765	6.33	462	8.61	331	8.86	271	7.61
211	7.33	110	6.45	94	5.21	62	7.25
48	4.89	25	6.94	12	2.09	9	2.21
8	4.66	5	3.22	5	1.24	4	2.46
4	.44	3	.99	2	.27	2	.00

PARAMETER VALUES

PS : 7.13	ALPHA : .421	BETA : .0000
(6.40, 7.85)	(.325, .517)	(-.0020, .0020)

SAMPLE TEMP	26.2 C	INCUBATION TEMP	26.5 C
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CHLOROPHYLL :	.06	NITRATE :	.32
CARBON :	80	SILICATE :	.59
NITROGEN :	6	PHOSPHATE :	.00

BARBADOS 1984

LAT	23 38.0' N	LONG	70 25.0' W	DATE	09/12/84	DEPTH	40 M
I	P	I	P	I	P	I	P
690	5.37	618	5.71	546	8.85	427	6.36
375	9.38	327	9.77	319	8.88	307	7.58
251	9.01	243	7.67	207	6.14	183	6.30
155	8.07	120	5.70	118	8.24	112	5.43
98	6.69	81	6.64	54	4.09	40	5.49
37	5.93	30	2.30	23	1.99	20	2.59
16	1.62	16	3.51	14	2.94	9	1.11
5	1.56	4	.17	4	.23	2	.46

PARAMETER VALUES

PS : 9.00	ALPHA : .142	BETA : .0039
(7.77, 10.23)	(.120, .164)	(.0004, .0074)

SAMPLE TEMP	25.2 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.07	NITRATE :	.00
CARBON :	102	SILICATE :	.57
NITROGEN :	5	PHOSPHATE :	.06

BARBADOS 1984

LAT	23 38.0' N	LONG	70 25.0' W	DATE	09/12/84	DEPTH	30 M
I	P	I	P	I	P	I	P
765	5.40	666	8.15	462	9.22	331	9.59
287	8.73	211	10.25	175	9.50	163	6.77
132	5.76	128	7.77	94	4.94	75	3.78
62	5.80	51	2.42	48	3.12	39	5.83
37	2.97	30	2.43	11	3.94	7	1.57
7	2.03	5	.97	4	1.02	4	1.11
2	.73						

62

PARAMETER VALUES

PS : 19.85	ALPHA : .089	BETA : .0287
(4.19, 35.52)	(.076, .102)	(-.0146, .0720)

SAMPLE TEMP	25.2 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.07	NITRATE :	.00
CARBON :	73	SILICATE :	.31
NITROGEN :	4	PHOSPHATE :	.07

BARBADOS 1984

LAT	23 38.0' N	LONG	70 25.0' W	DATE	09/12/84	DEPTH	20 M
I	P	I	P	I	P	I	P
690	2.93	618	2.98	546	4.25	427	3.62
375	3.24	327	4.43	243	4.36	179	4.47
98	4.02	69	3.85	54	4.48	40	3.35
37	4.07	30	2.74	23	2.68	20	4.31
16	1.95	11	.62	9	1.78	9	1.79
5	.57	4	.12	4	.18	4	.63
3	.84	2	.00				

63

PARAMETER VALUES

PS : 4.78	ALPHA : .190	BETA : .0028
(4.31, 5.25)	(.163, .216)	(.0013, .0043)

SAMPLE TEMP	25.2 C	INCUBATION TEMP	26.5 C
CHLOROPHYLL :	.07	NITRATE :	.00
CARBON :	42	SILICATE :	.31
NITROGEN :	8	PHOSPHATE :	.06

BARBADOS 1984

LAT	23 38.0' N	LONG	70 25.0' W	DATE	09/12/84	DEPTH	10 M
I	P	I	P	I	P	I	P
765	2.90	462	3.67	407	4.15	355	2.82
331	3.46	287	2.79	251	2.84	243	3.65
211	3.68	175	3.29	128	4.04	94	4.31
75	3.34	62	3.40	51	3.55	39	3.04
37	3.80	25	2.87	16	2.06	16	1.90
12	1.18	11	.48	8	1.48	7	1.17
7	1.19	5	.54	5	.78	4	.74
4	.47	2	1.16	2	.00		

PARAMETER VALUES

PS : 3.89	ALPHA : .172	BETA : .0015
(3.63, 4.16)	(.151, .193)	(.0005, .0024)

SAMPLE TEMP	25.2 C	INCUBATION TEMP	26.5 C
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CHLOROPHYLL :	.07	NITRATE :	.00
CARBON :	65	SILICATE :	.36
NITROGEN :	10	PHOSPHATE :	.00

BARBADOS 1984

LAT	26 41.6' N	LONG	73 39.4' W	DATE	10/12/84	DEPTH	30 M
I	P	I	P	I	P	I	P
618	1.80	546	2.69	427	3.40	375	4.56
327	3.77	307	5.17	251	4.86	243	3.78
207	5.33	183	4.50	179	5.38	98	4.65
81	5.53	77	5.01	69	4.60	54	3.61
40	3.60	37	4.28	28	3.02	23	1.99
20	1.98	16	1.02	16	2.06	14	1.65
11	1.17	9	.58	9	1.25	7	1.43
4	.06	4	.32	2	.81		

PARAMETER VALUES

PS : 7.65	ALPHA : .131	BETA : .0145
(6.71, 8.58)	(.121, .142)	(.0099, .0191)

SAMPLE TEMP	24.1 C	INCUBATION TEMP	26.0 C
CHLOROPHYLL :	.11	NITRATE :	.00
CARBON :	69	SILICATE :	.56
NITROGEN :	6	PHOSPHATE :	.25

BARBADOS 1984

LAT	26 41.6' N	LONG	73 39.4' W	DATE	10/12/84	DEPTH	20 M
I	P	I	P	I	P	I	P
765	1.63	462	3.64	407	3.14	355	3.63
287	3.17	271	3.49	243	3.91	211	3.97
175	3.53	163	3.33	132	2.54	128	3.34
110	2.30	81	2.38	75	1.89	62	2.80
39	2.31	25	1.50	24	1.58	16	1.46
9	.18	7	.45	7	.12	5	.04
5	.06	4	.15	4	.00		

PARAMETER VALUES

PS : 5.60	ALPHA : .050	BETA : .0073
(4.16, 7.03)	(.043, .056)	(.0024, .0122)

SAMPLE TEMP	24.1 C	INCUBATION TEMP	26.0 C
CHLOROPHYLL :	.12	NITRATE :	.00
CARBON :	60	SILICATE :	.50
NITROGEN :	7	PHOSPHATE :	.14

BARBADOS 1984

LAT	26 41.6' N	LONG	73 39.4' W	DATE	10/12/84	DEPTH	10 M
	P		P		P		P
690	3.46	546	3.59	427	4.34	375	3.49
327	3.74	319	4.39	307	3.85	251	3.51
243	4.08	207	4.12	183	4.63	179	4.20
155	4.67	120	4.23	118	4.25	112	3.91
98	3.76	81	3.85	77	3.62	54	2.96
40	2.70	37	2.61	30	2.73	28	1.11
23	1.36	20	1.92	16	1.53	16	1.03
14	1.38	11	.56	9	.05	4	.10
4	.70	4	.13	3	.69	2	.00

PARAMETER VALUES

PS : 4.81	ALPHA : .094	BETA : .0026
(4.48, 5.13)	(.087, .102)	(.0015, .0036)

SAMPLE TEMP	24.1 C	INCUBATION TEMP	24.0 C
CHLOROPHYLL :	.11	NITRATE :	.00
CARBON :	73	SILICATE :	.53
NITROGEN :	5	PHOSPHATE :	.13

BARBADOS 1984

LAT	26 41.6' N	LONG	73 39.4' W	DATE	10/12/84	DEPTH	5 M
I	P	I	P	I	P	I	P
765	5.64	666	6.33	462	6.05	407	6.46
355	6.66	331	7.32	271	5.69	251	6.35
243	6.42	211	6.19	175	6.61	163	7.06
132	6.10	128	6.36	110	5.50	94	5.96
81	5.16	75	5.14	62	3.70	51	4.63
48	4.78	39	4.18	37	4.96	30	5.34
25	2.89	24	2.65	16	1.46	16	1.77
12	1.36	11	.86	9	.68	8	1.25
7	.79	5	.70	4	.50	2	.00
2	.23						

68

PARAMETER VALUES

PS : 6.69	ALPHA : .154	BETA : .0009
(6.32, 7.06)	(.141, .166)	(-.0001, .0019)

SAMPLE TEMP 24.1 C INCUBATION TEMP 24.0 C

CHLOROPHYLL :	.11	NITRATE :	.00
CARBON :	81	SILICATE :	.53
NITROGEN :	7	PHOSPHATE :	.18

69

BARBADOS 1984

LAT	29 50.0' N	LONG	77 18.9' W	DATE	11/12/84	DEPTH	30 M
	P		P		P		P
690	1.43	618	2.53	546	2.91	427	2.42
375	3.29	327	3.67	251	3.73	243	4.55
207	3.81	183	4.60	155	3.70	120	3.71
112	4.20	81	3.58	69	2.90	54	3.18
37	2.93	30	1.96	28	1.87	20	1.42
16	1.62	16	1.24	14	1.09	11	.77
9	.87	9	.48	7	.33	5	.20
4	.43	4	.08	4	.11	2	.19

PARAMETER VALUES

PS : 6.00	ALPHA : .087	BETA : .0098
(5.43, 6.58)	(.080, .093)	(.0073, .0122)

SAMPLE TEMP	22.6 C	INCUBATION TEMP	22.8 C
CHLOROPHYLL :	.24	NITRATE :	.01
CARBON :	38	SILICATE :	.29
NITROGEN :	4	PHOSPHATE :	.03

BARBADOS 1984

LAT	29 50.0' N	LONG	77 18.9' W	DATE	11/12/84	DEPTH	20 M
I	P	I	P	I	P	I	P
765	.23	407	.43	331	.48	287	.25
243	.95	211	.41	175	.72	128	.62
110	.81	94	1.18	81	.64	51	1.29
48	.84	37	1.47	25	1.03	16	.56
16	.69	12	.22	11	.22	9	.21
7	.02	4	.09				

PARAMETER VALUES

PS : 1.39	ALPHA : .053	BETA : .0051
(1.02, 1.75)	(.040, .067)	(.0018, .0084)

SAMPLE TEMP 22.6 C INCUBATION TEMP 22.8 C

CHLOROPHYLL : .24	NITRATE : .00
CARBON : 66	SILICATE : .90
NITROGEN : 6	PHOSPHATE : .03

BARBADOS 1984

LAT	29 50.0' N	LONG	77 18.9' W	DATE	11/12/84	DEPTH	10 M
I	P	I	P	I	P	I	P
690	.75	618	.87	546	1.13	427	.59
375	1.13	327	.70	251	1.36	243	1.52
183	1.67	155	1.76	120	1.90	69	2.09
54	1.88	37	1.63	30	.94	28	1.00
23	1.52	20	.92	16	.62	16	.79
14	.77	11	.33	9	.39	9	.50
7	.23	5	.22	4	.38	4	.19
3	.04	2	.05				

PARAMETER VALUES

PS : 2.54	ALPHA : .064	BETA : .0057
(2.22, 2.86)	(.058, .071)	(.0039, .0074)

SAMPLE TEMP	22.6 C	INCUBATION TEMP	22.8 C
CHLOROPHYLL	.24	NITRATE	.01
CARBON	66	SILICATE	.74
NITROGEN	3	PHOSPHATE	.00

BARBADOS 1984

LAT	29 50.0' N	LONG	77 18.9' W	DATE	11/12/84	DEPTH	5 M
I	P	I	P	I	P	I	P
765	2.12	666	1.63	462	2.28	407	2.42
355	1.62	331	1.87	287	2.49	271	2.51
243	2.35	211	2.38	175	3.04	163	3.00
132	2.01	128	2.89	94	2.76	75	2.60
51	2.72	48	1.83	39	1.86	37	2.63
30	1.92	25	1.62	24	1.33	16	1.81
16	1.88	12	1.09	11	1.77	10	1.46
8	.55	7	.49	7	.29	6	.33
5	.25	4	.23	4	.36	3	.13
N	.15	2	.11				

PARAMETER VALUES

PS : 3.21	ALPHA : .088	BETA : .0029
(3.00, 3.42)	(.081, .095)	(.0021, .0037)

SAMPLE TEMP	22.6 C	INCUBATION TEMP	22.8 C
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CHLOROPHYLL :	.25	NITRATE :	.08
CARBON :	40	SILICATE :	.76
NITROGEN :	12	PHOSPHATE :	.00

BARBADOS 1984

LAT	32 10.9' N	LONG	78 14.4' W	DATE	12/12/84	DEPTH	40 M
I	P	I	P	I	P	I	P
690	4.35	618	4.13	546	5.61	427	5.05
375	5.92	327	6.13	319	6.15	307	6.14
251	5.43	243	6.42	207	6.04	179	6.35
155	6.67	118	5.69	112	4.90	98	5.87
81	4.81	77	4.59	69	4.57	54	4.29
40	3.79	37	3.55	30	3.00	28	2.95
23	2.79	20	1.95	16	1.15	16	1.91
14	1.40	11	.75	9	1.06	9	.52
7	.54	5	.75	4	.31	4	.83
3	.21	2	.41				

PARAMETER VALUES

PS : 7.61 ALPHA : .119 BETA : .0060
 (7.18, 8.05) (.113, .125) (.0045, .0074)

SAMPLE TEMP	24.9 C	INCUBATION TEMP	22.5 C
CHLOROPHYLL	: .38	NITRATE	: .04
CARBON	: 97	SILICATE	: 1.08
NITROGEN	: 17	PHOSPHATE	: .04

BARBADOS 1984

LAT	32 10.9' N	LONG	78 14.4' W	DATE	12/12/84	DEPTH	20 M
I	P	I	P	I	P	I	P
765	3.79	666	4.49	462	4.93	355	5.01
331	4.94	287	4.48	271	4.65	251	5.56
243	4.27	211	4.52	175	5.30	163	4.54
132	4.83	128	4.94	110	5.23	94	3.94
81	3.74	75	4.02	62	3.98	51	3.59
48	2.90	39	2.54	37	3.14	30	2.41
25	2.09	24	2.01	16	1.47	16	1.35
12	1.11	11	1.00	9	.89	8	.61
7	.48	7	.36	5	.24	5	.19
4	.09	4	.06	2	.05		

PARAMETER VALUES

PS : 5.45	ALPHA : .102	BETA : .0020
(5.20, 5.70)	(.097, .108)	(.0013, .0027)

SAMPLE TEMP	24.9 C	INCUBATION TEMP	22.5 C
CHLOROPHYLL	: .41	NITRATE	: .01
CARBON	: 83	SILICATE	: 1.06
NITROGEN	: 11	PHOSPHATE	: .00

BARBADOS 1984

LAT	32 10.9' N	LONG	78 14.4' W	DATE	12/12/84	DEPTH	10 M
I	P	I	P	I	P	I	P
690	4.32	618	4.71	546	4.72	427	5.09
375	5.28	327	5.54	319	6.20	307	5.58
251	5.51	243	5.43	207	5.51	183	6.11
179	5.65	155	5.86	120	5.53	118	5.25
112	5.21	98	5.07	81	4.59	77	4.82
69	4.38	54	4.28	40	3.44	37	3.15
30	2.78	28	2.26	23	2.12	20	1.34
16	1.64	16	1.32	14	1.12	11	.76
9	.94	9	.56	7	.58	5	.48
4	.35	4	.37	4	.44	3	.31
2	.36	2	.13				

PARAMETER VALUES

PS : 6.91	ALPHA : .110	BETA : .0046
(6.67, 7.14)	(.106, .113)	(.0038, .0053)

SAMPLE TEMP	24.9 C	INCUBATION TEMP	22.5 C
CHLOROPHYLL :	.39	NITRATE :	.03
CARBON :	67	SILICATE :	1.11
NITROGEN :	17	PHOSPHATE :	.00

BARBADOS 1984

LAT	32 10.9' N	LONG	78 14.4' W	DATE	12/12/84	DEPTH	5 M
I	P	I	P	I	P	I	P
765	5.36	666	5.00	462	4.89	407	6.52
355	6.44	331	5.75	287	5.80	271	6.00
251	5.80	243	6.31	211	6.34	163	5.79
132	6.69	128	6.02	110	6.20	94	5.47
81	5.30	75	5.22	62	5.17	51	4.57
48	4.40	39	3.41	37	3.95	30	3.09
25	2.55	24	2.43	16	1.85	12	1.30
11	1.28	9	.94	8	.80	7	.68
7	.67	5	.36	5	.82	4	.67
4	.39	3	.46	2	.32	2	.16

PARAMETER VALUES

PS : 6.94	ALPHA : .139	BETA : .0030
(6.70, 7.18)	(.133, .145)	(.0023, .0037)

SAMPLE TEMP	24.9 C	INCUBATION TEMP	22.5 C
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CHLOROPHYLL :	.39	NITRATE :	.01
CARBON :	82	SILICATE :	1.10
NITROGEN :	9	PHOSPHATE :	.00

BARBADOS 1984

LAT	34 21.0' N	LONG	75 39.6' W	DATE	13/12/84	DEPTH	40 M
I	P	I	P	I	P	I	P
586	4.52	498	4.27	403	6.48	327	5.88
295	6.86	275	5.82	259	6.44	235	7.13
203	5.83	183	6.94	163	6.99	155	6.67
155	6.13	116	6.64	111	5.90	106	5.41
84	5.42	83	5.43	76	5.32	58	4.60
57	4.47	45	3.72	41	3.86	31	3.04
28	2.53	24	2.32	19	1.98	18	1.72
14	1.48	13	1.37	9	.96	8	.88
7	1.02	6	.54	6	.64	5	.46
5	.54	4	.43	3	.18	3	.57
2	.20						

77

PARAMETER VALUES

PS :	9.36	ALPHA :	.117	BETA :	.0118
(	8.66, 10.06 )	(	.112, .122 )	(	.0091, .0146)

SAMPLE TEMP	24.6 C	INCUBATION TEMP	22.5 C
CHLOROPHYLL	: .36	NITRATE	: .07
CARBON	: 65	SILICATE	: 1.51
NITROGEN	: 8	PHOSPHATE	: .00

BARBADOS 1984

LAT	34 21.0' N	LONG	75 39.6' W	DATE	13/12/84	DEPTH	20 M
I	P	I	P	I	P	I	P
694	1.53	431	1.21	399	1.06	291	1.32
291	1.25	259	1.54	183	1.38	148	1.12
144	1.27	112	1.46	104	1.43	96	1.31
87	1.21	77	1.55	66	1.41	61	1.10
37	.84	26	1.06	18	.66	16	.72
15	.53	13	.44	11	.41	10	.38
8	.40	6	.21	6	.16	5	.07
4	.27	3	.13	2	.05	2	.10

PARAMETER VALUES

PS : 1.36	ALPHA : .051	BETA : .0001
(1.29, 1.43)	(.046, .056)	(-.0002, .0003)

SAMPLE TEMP	24.6 C	INCUBATION TEMP	22.5 C
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CHLOROPHYLL :	.36	NITRATE :	.11
CARBON :	50	SILICATE :	1.57
NITROGEN :	13	PHOSPHATE :	.00

BARBADOS 1984

LAT 34 21.0' N		LONG 75 39.6' W		DATE 13/12/84		DEPTH	10 M
I	P	I	P	I	P	I	P
586	.39	498	.59	458	.57	403	.57
327	.74	259	.63	235	.90	203	.89
183	1.01	155	.67	155	.88	116	.91
111	.93	106	.82	83	1.11	45	1.15
41	1.18	31	.93	28	1.04	24	.69
19	.61	18	.74	14	.48	13	.27
9	.44	8	.40	7	.38	6	.19
6	.28	5	.11	5	.11	4	.14
3	.04	3	.12				

PARAMETER VALUES

PS : 1.22 ALPHA : .055 BETA : .0022
 (1.13, 1.31) (.050, .060) (.0016, .0027)

SAMPLE TEMP	24.6 C	INCUBATION TEMP	22.5 C
CHLOROPHYLL	: .36	NITRATE	: .06
CARBON	: 52	SILICATE	: 1.64
NITROGEN	: 8	PHOSPHATE	: .00

BARBADOS 1984

LAT	34 21.0' N	LONG	75 39.6' W	DATE	13/12/84	DEPTH	5 M
I	P	I	P	I	P	I	P
694	1.21	630	1.32	431	1.26	399	1.37
383	1.33	291	1.39	291	1.63	259	1.61
227	1.76	183	1.36	171	1.70	148	1.69
112	1.19	104	1.45	96	1.77	66	1.44
66	1.20	43	1.60	37	1.33	26	1.18
20	.89	18	.97	16	.82	15	.75
13	.66	11	.38	10	.41	8	.36
7	.26	6	.16	6	.32	5	.35
4	.06	3	.02				

PARAMETER VALUES

PS : 1.68	ALPHA : .063	BETA : .0008
(1.59, 1.77)	(.057, .069)	(.0004, .0011)

SAMPLE TEMP	24.6 C	INCUBATION TEMP	22.5 C
CHLOROPHYLL :	.37	NITRATE :	.02
CARBON :	36	SILICATE :	1.61
NITROGEN :	12	PHOSPHATE :	.00

BARBADOS 1984

LAT	35 37.1' N	LONG	75 13.5' W	DATE	14/12/84	DEPTH	15 M
I	P	I	P	I	P	I	P
586	2.62	498	3.31	458	3.17	403	3.17
295	3.16	275	3.53	259	2.73	235	3.03
203	3.09	183	3.41	163	3.09	155	3.12
155	3.57	116	3.17	111	3.25	106	3.18
84	3.03	83	2.85	76	2.73	58	2.48
45	1.72	41	2.07	31	1.45	28	1.25
24	1.17	19	.95	18	.79	14	.59
13	.53	9	.34	8	.37	7	.27
6	.16	6	.14	5	.31	5	.20
4	.13	3	.17	3	.13	2	.03

PARAMETER VALUES

PS : 3.82	ALPHA : .063	BETA : .0020
(3.59, 4.05)	(.060, .067)	(.0012, .0027)

SAMPLE TEMP	15.5 C	INCUBATION TEMP	19.0 C
CHLOROPHYLL	: 2.02	NITRATE	: .02
CARBON	: 155	SILICATE	: .84
NITROGEN	: 20	PHOSPHATE	: .05

BARBADOS 1984

LAT	35 37.1' N	LONG	75 13.5' W	DATE	14/12/84	DEPTH	5 M
I	P	I	P	I	P	I	P
694	4.04	630	3.76	431	3.80	399	3.85
383	3.98	291	4.04	291	3.89	259	3.95
227	3.77	219	3.89	183	3.78	171	3.75
148	3.31	144	3.44	112	3.16	104	3.33
96	2.94	87	2.97	77	2.76	66	2.11
66	2.51	61	2.39	43	1.88	37	1.71
26	1.10	26	1.32	20	.97	18	.72
16	.67	15	.47	13	.48	11	.38
10	.27	8	.23	7	.39	6	.13
6	.18	5	.13	4	.12	3	.05
22	.08	2	.03				

PARAMETER VALUES

PS : 4.21 ALPHA : .054 BETA : .0006
 (-4.05, 4.37) (.053, .056) (.0002, .0009)

SAMPLE TEMP	15.2 C	INCUBATION TEMP	19.0 C
CHLOROPHYLL :	2.14	NITRATE :	.00
CARBON :	169	SILICATE :	.82
NITROGEN :	23	PHOSPHATE :	.05

BARBADOS 1984

LAT	35 17.9' N	LONG	74 42.2' W	DATE	14/12/84	DEPTH	50 M
I	P	I	P	I	P	I	P
598	2.52	538	2.02	347	2.72	331	2.45
291	2.31	215	2.55	199	2.71	175	2.80
167	2.38	118	2.57	116	2.73	81	2.74
76	2.51	53	1.98	42	2.21	36	1.57
30	1.96	24	1.18	22	1.30	18	1.15
12	.92	11	.88	9	.58	7	.31
5	.63	5	.23	4	.25	3	.26
3	.17	2	.36	2	.13		

83

PARAMETER VALUES

PS :	2.85	ALPHA :	.083	BETA :	.0011
(2.71, 2.98)		(.078, .089)		(.0006, .0016)	

SAMPLE TEMP	24.4 C	INCUBATION TEMP	21.0 C
CHLOROPHYLL	: .44	NITRATE	: .00
CARBON	: 61	SILICATE	: .28
NITROGEN	: 5	PHOSPHATE	: .00

BARBADOS 1984

LAT	35 17.9' N	LONG	74 42.2' W	DATE	14/12/84	DEPTH	5 M
I	P	I	P	I	P	I	P
610	1.16	562	2.21	291	2.68	259	3.44
227	2.86	199	2.85	171	3.30	124	3.48
110	3.16	106	3.19	85	3.06	61	2.99
57	2.43	46	2.40	45	2.56	33	2.05
30	2.12	24	1.82	23	1.48	17	.83
17	1.16	12	.76	10	.73	9	.45
8	.43	7	.42	6	.25	5	.33
5	.24	4	.15	2	.22	2	.12
2	.23						

78

PARAMETER VALUES

PS :	4.62	ALPHA :	.082	BETA :	.0079
(4.24, 4.99)	(.078, .087)	(.0061, .0098)

SAMPLE TEMP	24.4 C	INCUBATION TEMP	21.0 C
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CHLOROPHYLL :	.47	NITRATE :	.14
CARBON :	83	SILICATE :	.34
NITROGEN :	44	PHOSPHATE :	.01

BARBADOS 1984

LAT	36 54.5' N	LONG	74 49.0' W	DATE	15/12/84	DEPTH	10 M
I	P	I	P	I	P	I	P
578	1.71	518	2.63	458	1.85	375	2.34
339	2.79	259	2.50	255	2.82	207	2.97
199	3.07	195	3.10	155	3.26	132	2.86
100	2.81	86	2.35	68	1.96	63	2.06
53	2.13	40	1.89	37	1.90	33	1.54
26	1.25	23	1.28	17	.69	14	.63
12	.45	11	.57	10	.23	8	.65
7	.38	7	.29	5	.15	4	.10
4	.35	4	.20	3	.05	3	.08
2	.02						

55

PARAMETER VALUES

PS : 4.15	ALPHA : .058	BETA : .0056
(3.77, 4.54)	(.054, .061)	(.0041, .0072)

SAMPLE TEMP	13.8 C	INCUBATION TEMP	18.0 C
CHLOROPHYLL	: 1.87	NITRATE	: 2.25
CARBON	: 114	SILICATE	: 1.35
NITROGEN	: 20	PHOSPHATE	: .30

BARBADOS 1984

LAT	36 54.5' N	LONG	74 49.0' W	DATE	15/12/84	DEPTH	5 M
I	P	I	P	I	P	I	P
578	2.04	566	2.60	395	3.13	371	2.87
335	2.68	287	2.91	287	2.52	207	2.53
203	2.26	203	2.12	187	2.74	155	2.69
136	2.38	100	2.06	98	2.47	81	2.01
72	2.33	65	2.33	46	1.88	41	1.50
33	1.32	31	1.00	22	.92	17	.63
11	.55	11	.46	9	.21	7	.20
6	.15	5	.30	5	.31	5	.06
4	.06	3	.09	2	.26		

PARAMETER VALUES

PS : 2.77	ALPHA : .053	BETA : .0005
(2.56, 2.98)	(.049, .058)	(-.0002, .0011)

SAMPLE TEMP	13.8 C	INCUBATION TEMP	18.0 C
CHLOROPHYLL :	1.89	NITRATE :	2.56
CARBON :	117	SILICATE :	1.57
NITROGEN :	15	PHOSPHATE :	.33

BARBADOS 1984

LAT	36 54.5' N	LONG	74 11.7' W	DATE	15/12/84	DEPTH	20 M
I	P	I	P	I	P	I	P
578	1.03	518	1.58	458	1.45	375	2.01
339	2.70	259	3.20	255	3.60	247	2.88
207	3.16	199	3.72	195	3.71	155	3.46
144	3.65	132	3.53	100	3.67	98	3.61
86	3.35	68	2.75	53	2.85	40	2.59
33	2.35	26	1.88	23	1.67	19	1.52
17	1.28	14	1.26	12	.95	11	.87
10	.68	8	.51	7	.44	7	.43
5	.19	4	.22	4	.24	4	.22
3	.21	3	.17	2	.10		

PARAMETER VALUES

PS : 7.03 ALPHA : .085 BETA : .0216
 (6.29, 7.77) (.081, .088) (.0171, .0260)

SAMPLE TEMP	16.0 C	INCUBATION TEMP	17.0 C
CHLOROPHYLL	: 1.65	NITRATE	: 1.82
CARBON	: 116	SILICATE	: 2.13
NITROGEN	: 65	PHOSPHATE	: .27

BARBADOS 1984

LAT 36 54.5' N		LONG 74 11.7' W		DATE 15/12/84		DEPTH	5 M
I	P	I	P	I	P	I	P
578	2.77	566	2.23	395	3.05	371	3.25
287	3.66	287	4.08	207	3.06	203	3.68
187	3.16	155	3.30	136	3.63	128	3.78
120	3.64	100	3.42	98	2.90	81	3.03
72	3.22	66	2.74	65	2.74	46	2.29
41	2.12	33	1.80	31	1.85	22	1.24
21	1.06	17	.95	16	.69	11	.47
11	.58	9	.36	7	.38	6	.26
5	.17	5	.31	5	.13	4	.11
3	.15	2	.08	2	.12	1	.04

PARAMETER VALUES

PS : 4.80	ALPHA : .069	BETA : .0052
(4.41, 5.18)	(.065, .073)	(.0038, .0067)

SAMPLE TEMP	16.0 C	INCUBATION TEMP	17.0 C
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CHLOROPHYLL :	1.35	NITRATE :	1.90
CARBON :	119	SILICATE :	2.31
NITROGEN :	65	PHOSPHATE :	.21

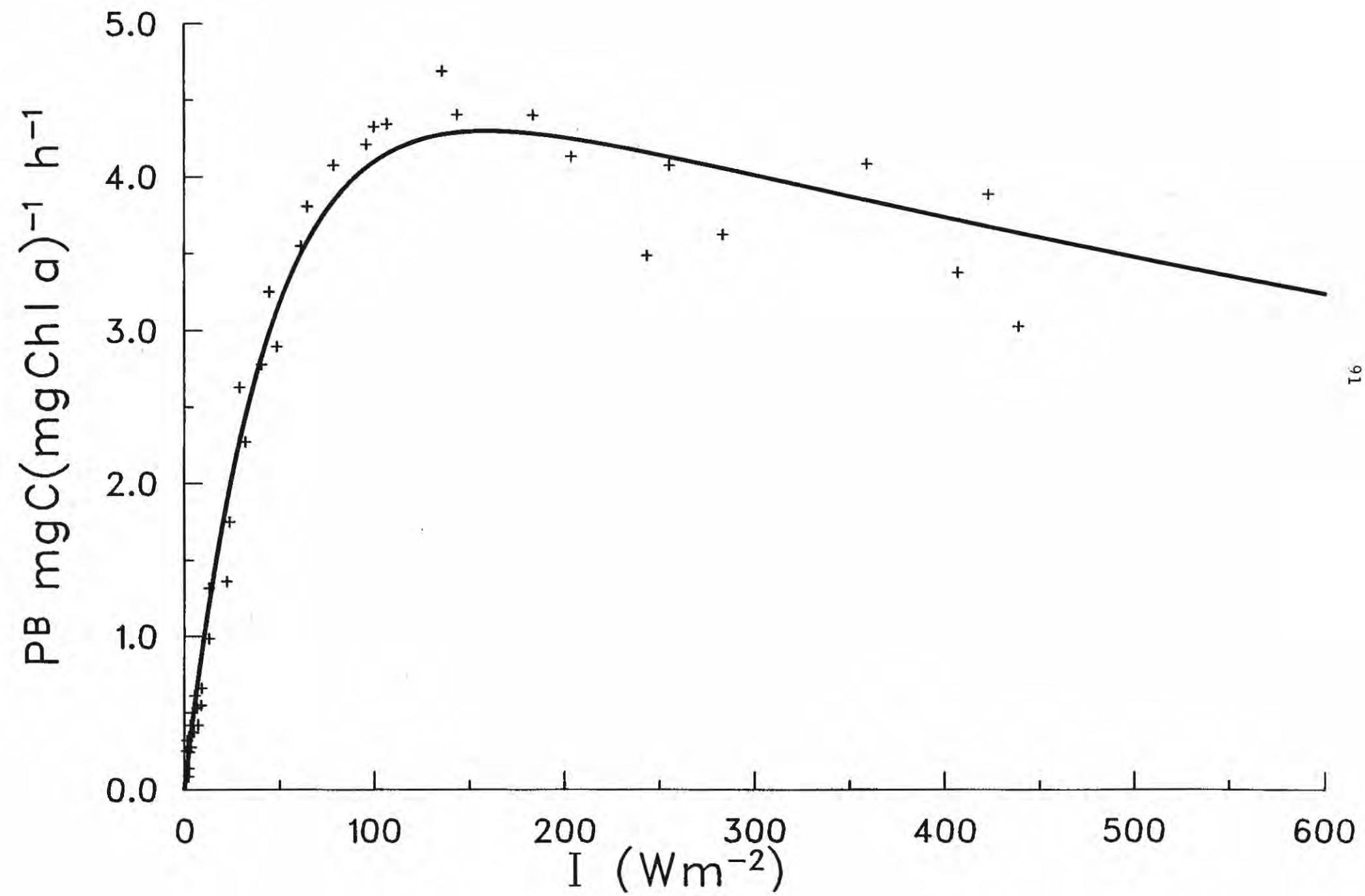
Solid Line Fit to Observed Carbon PI Data

ID 8408468

STA. 6

05/12/84

10 M

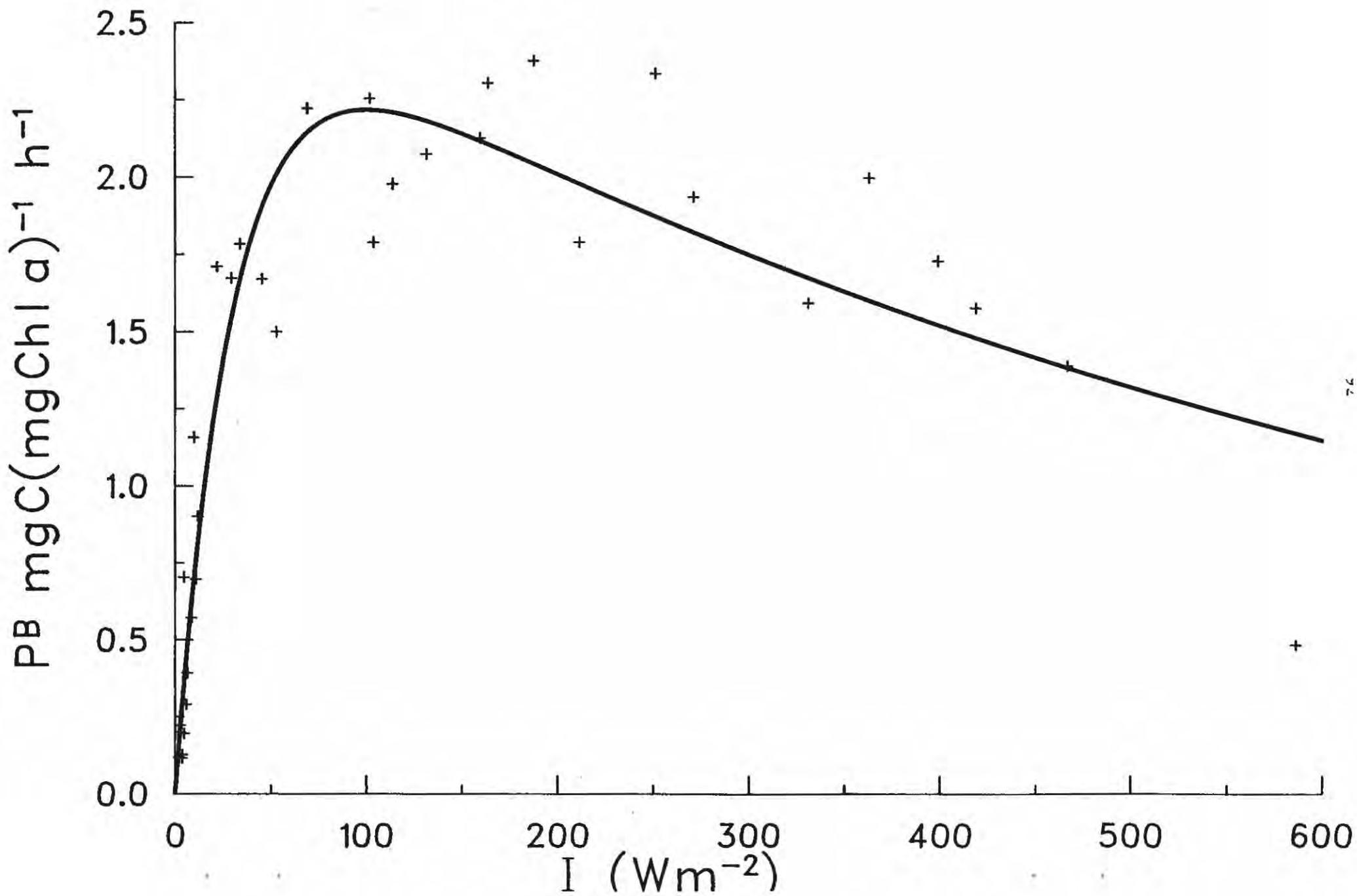


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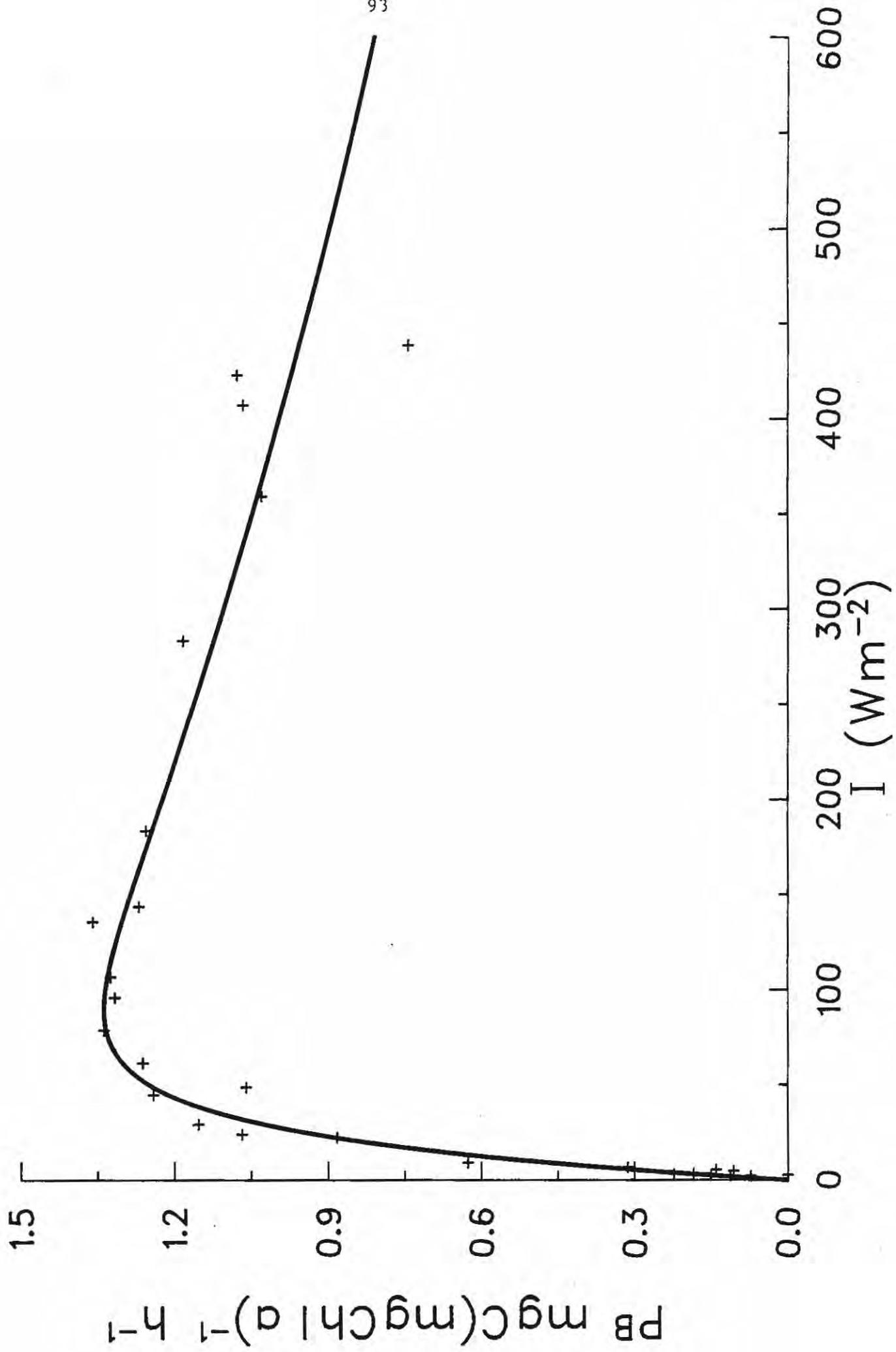
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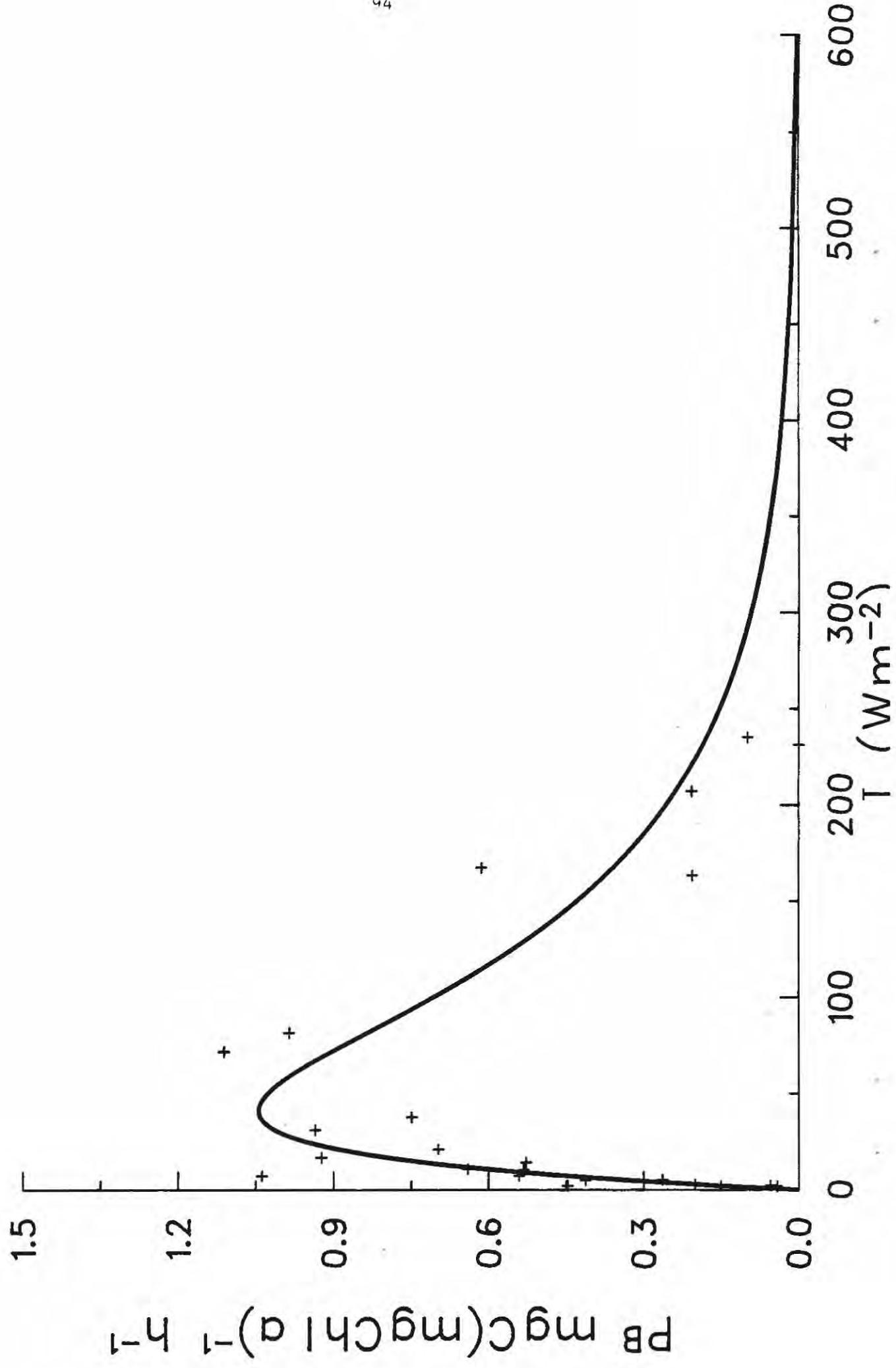


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93

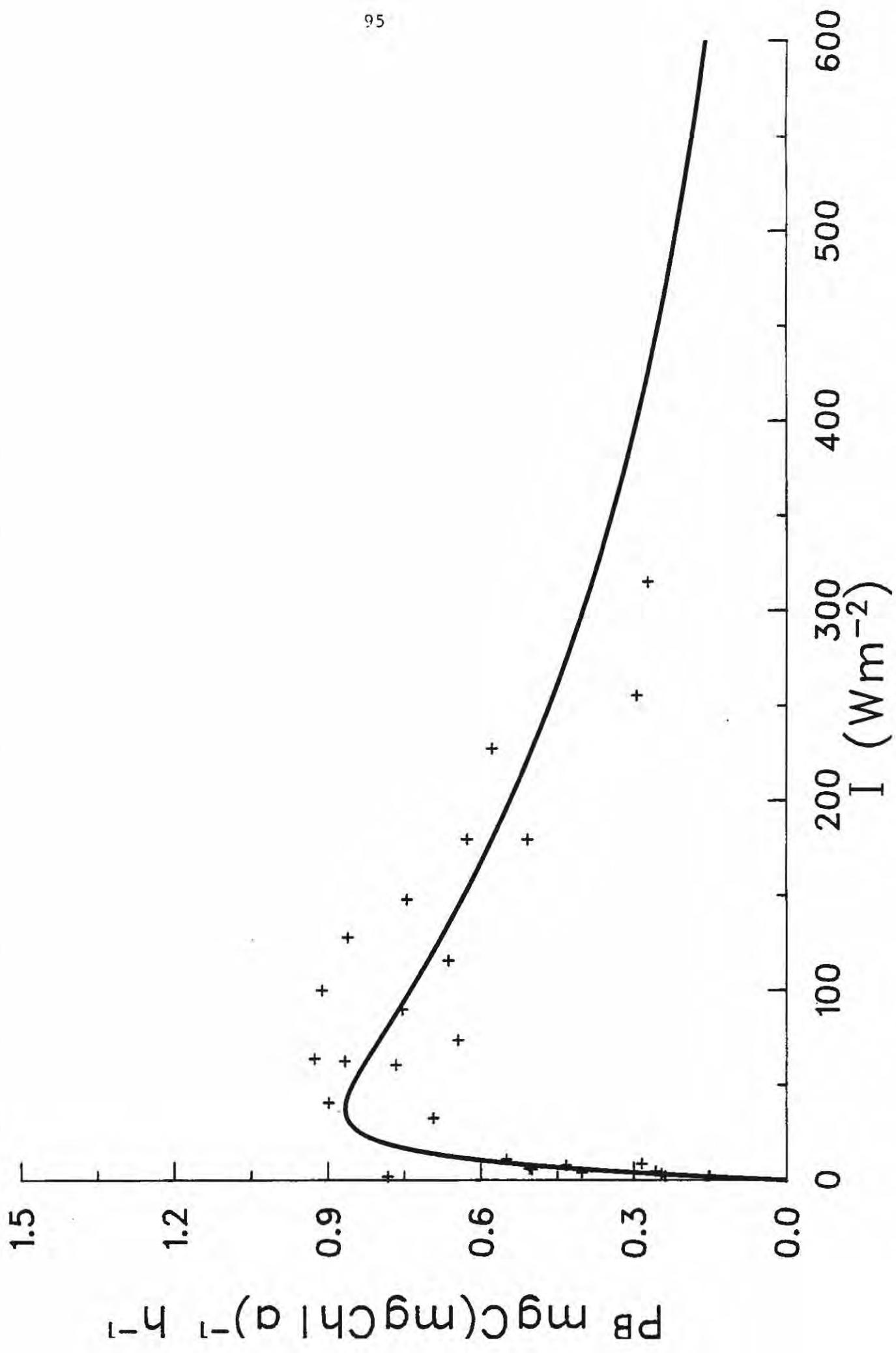


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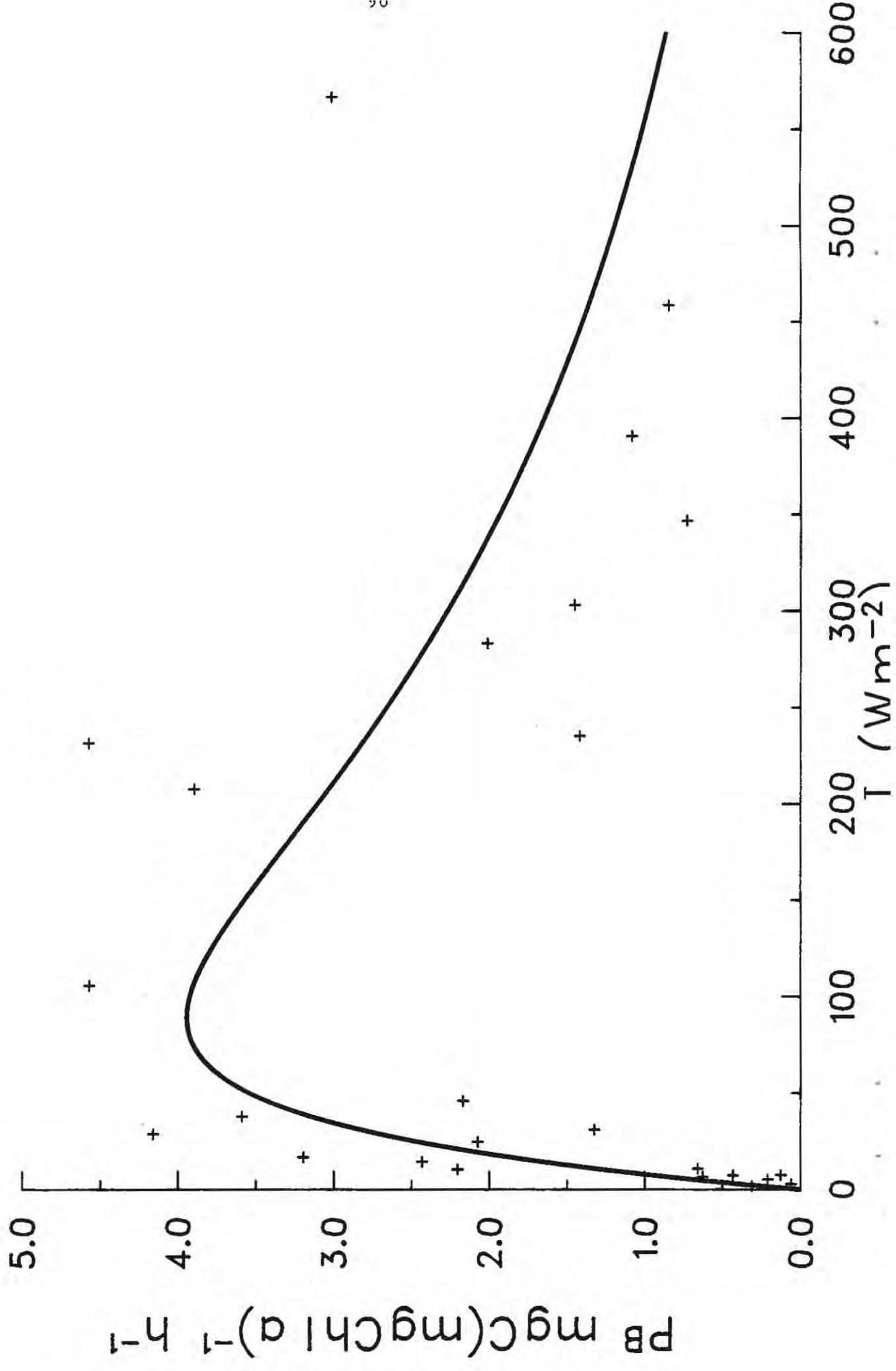


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95



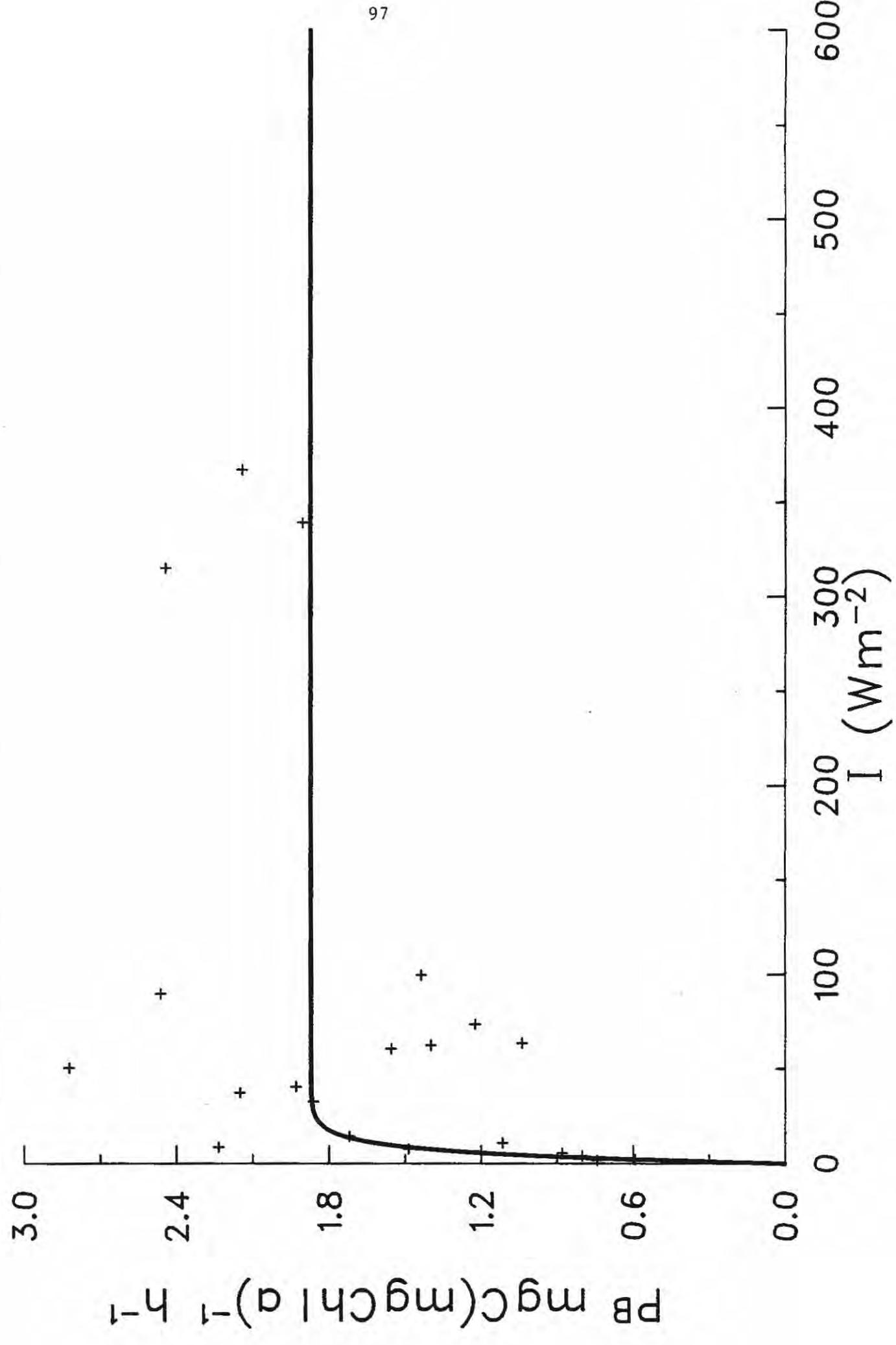
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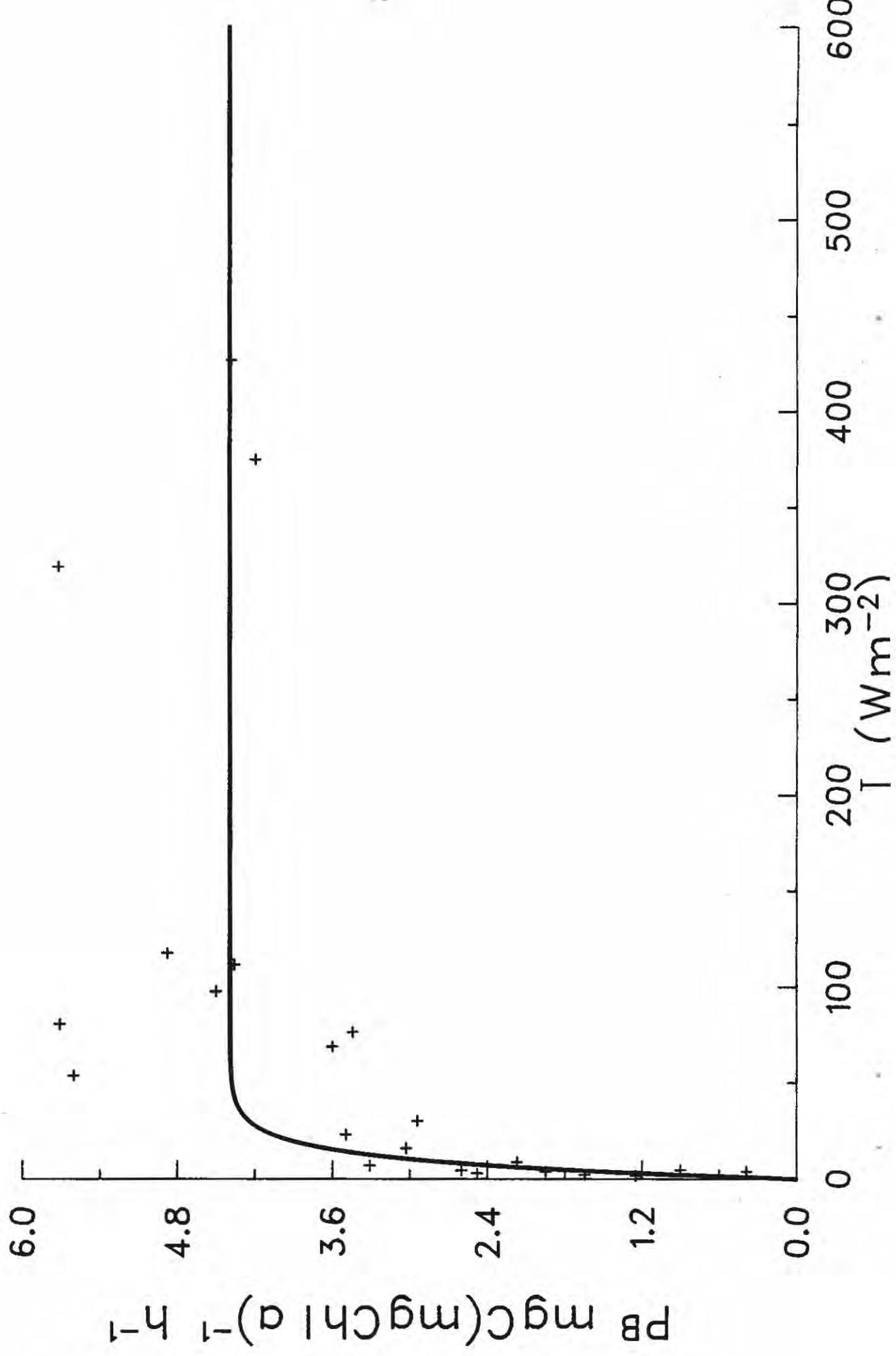
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STA. 9



ID 8407953

STA. 11 08/12/84 30 M

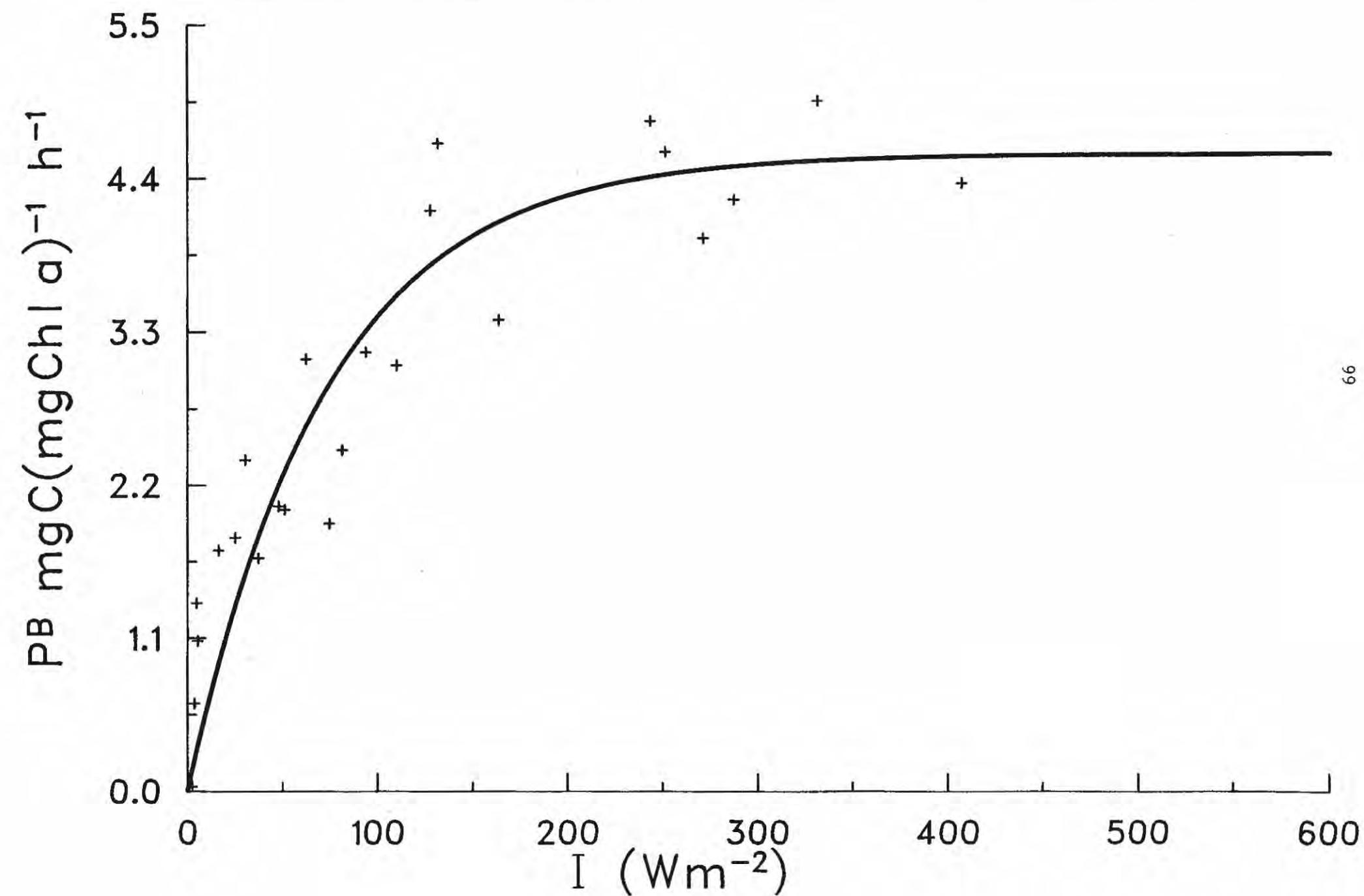


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STA. 11

08/12/84

20 M

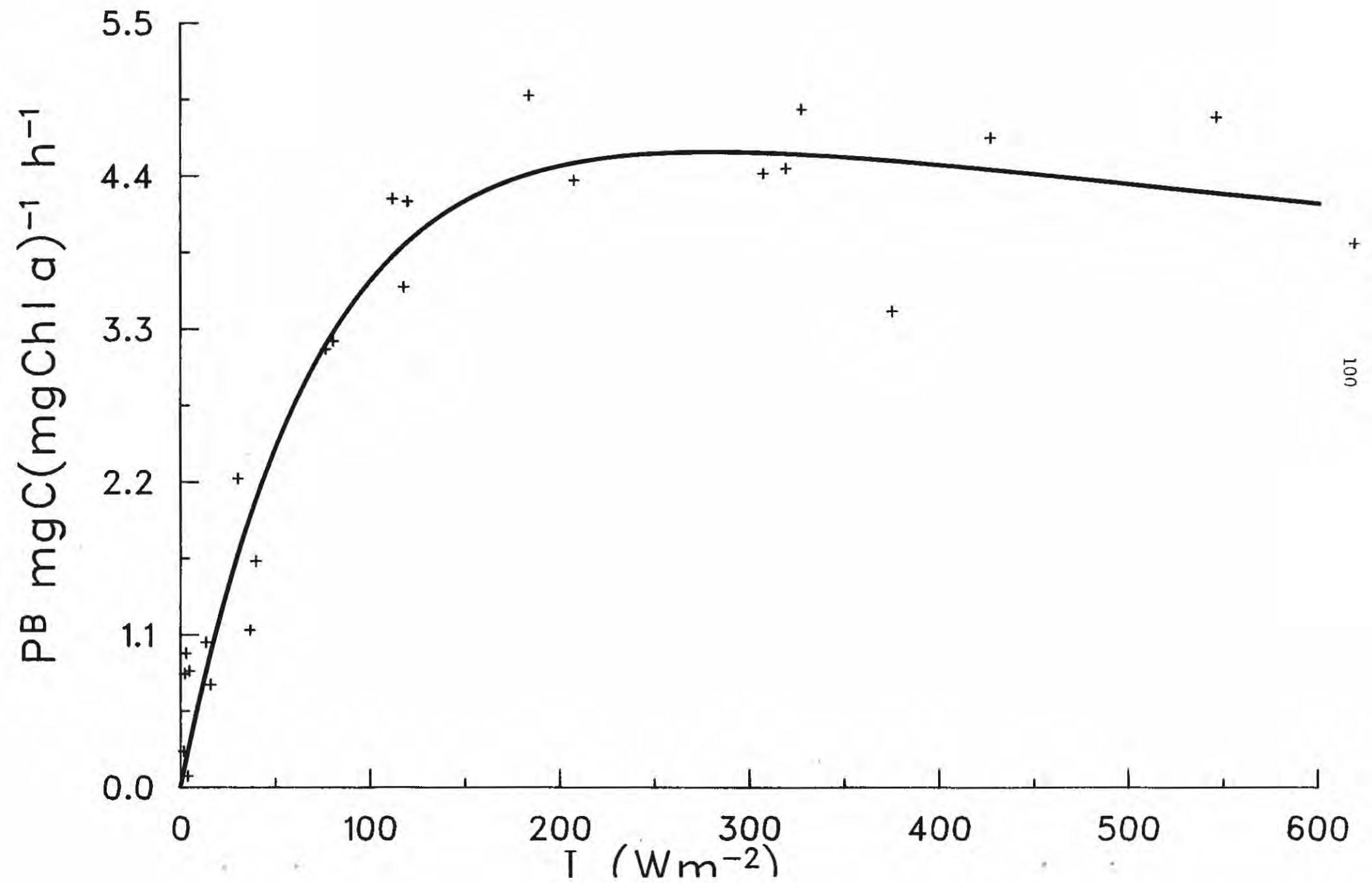


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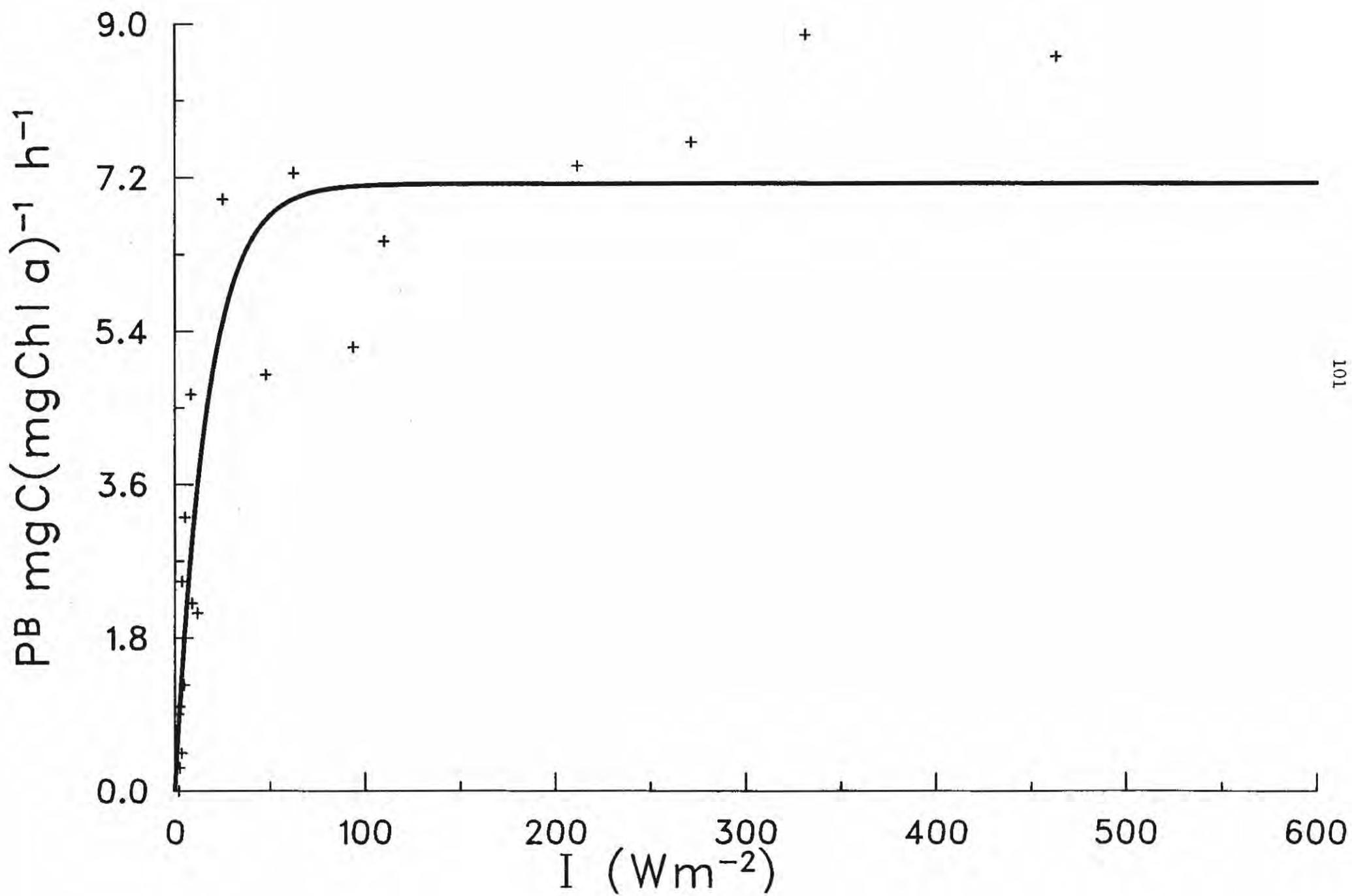
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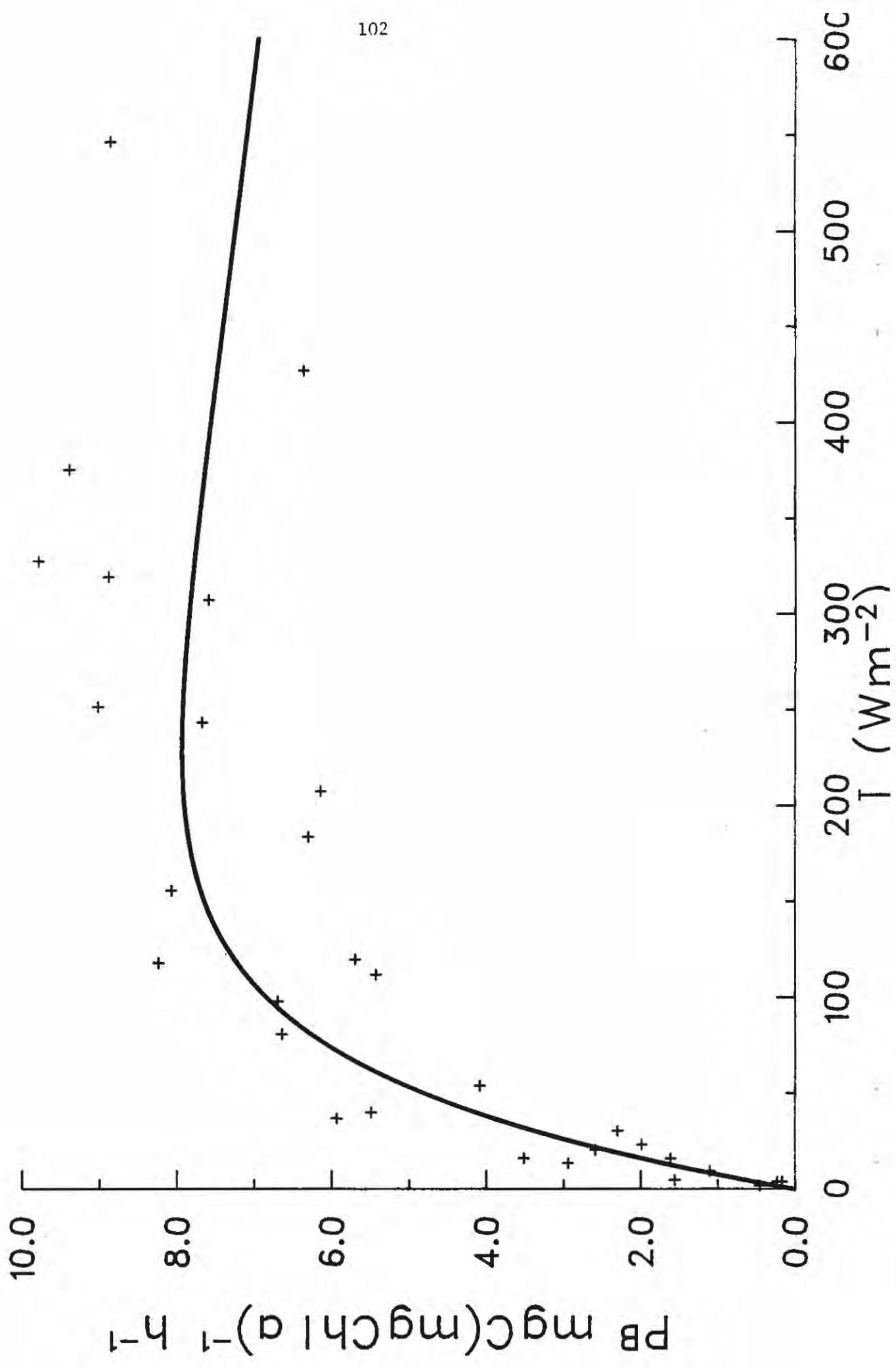


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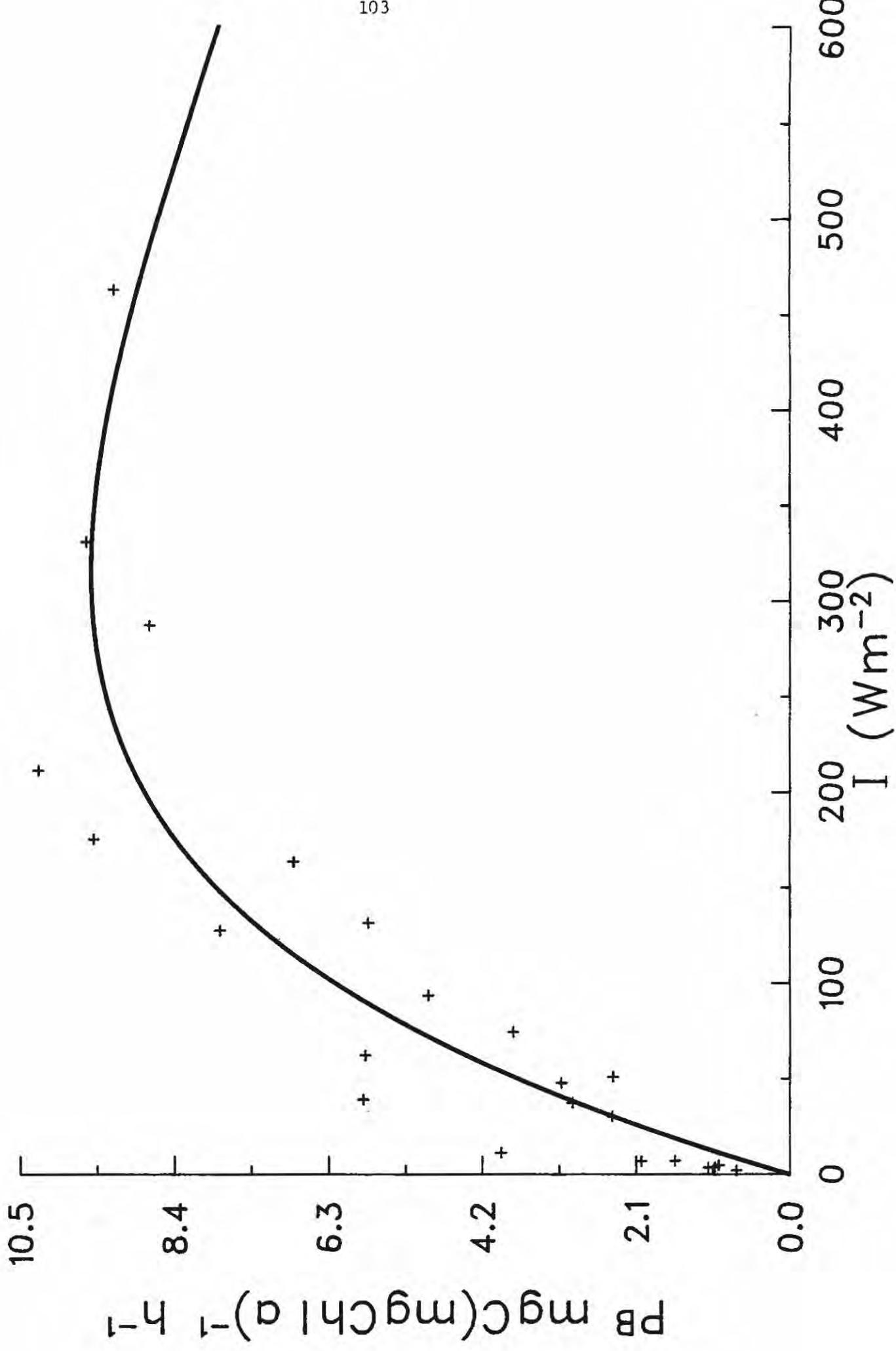
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102



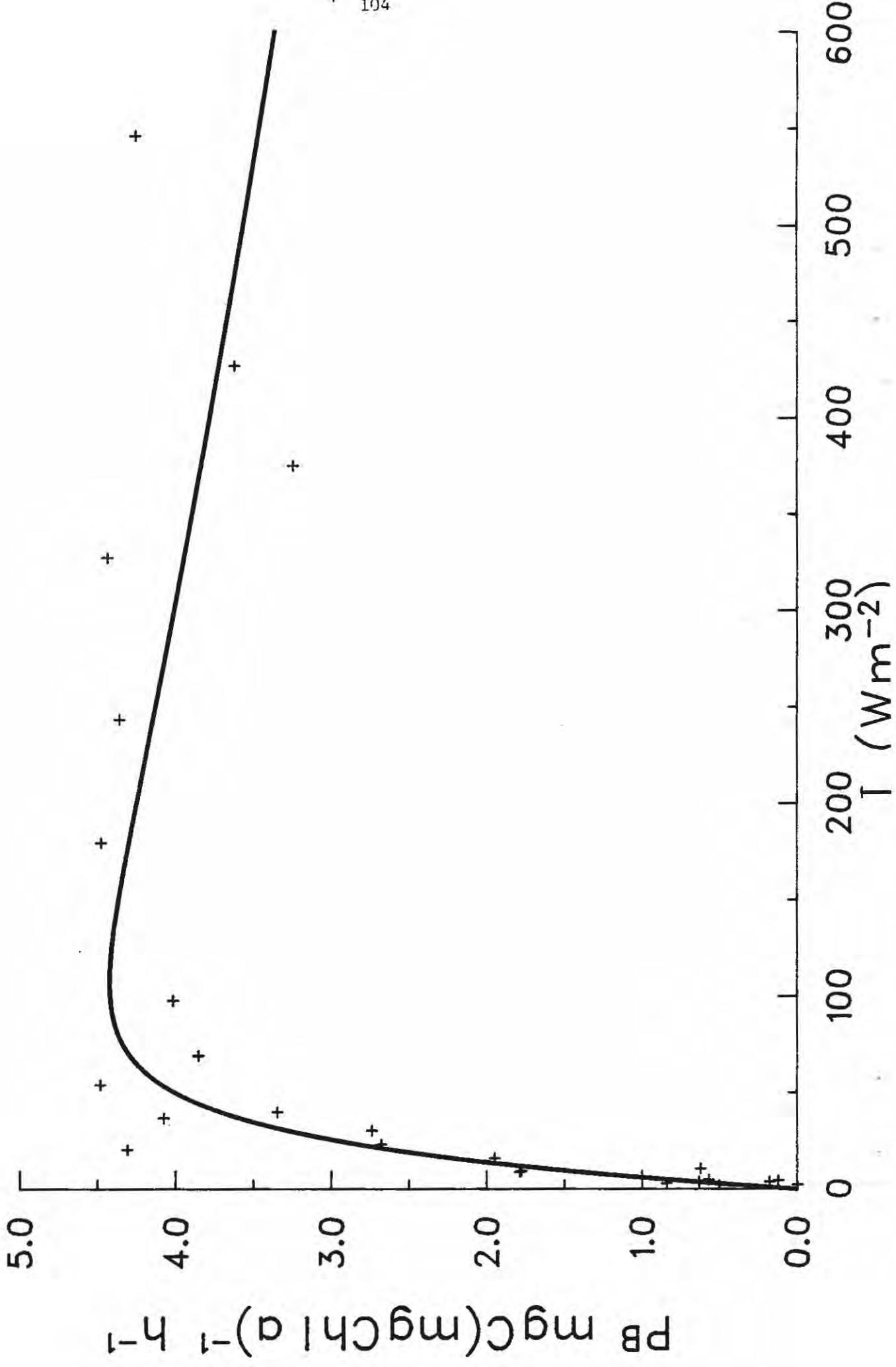
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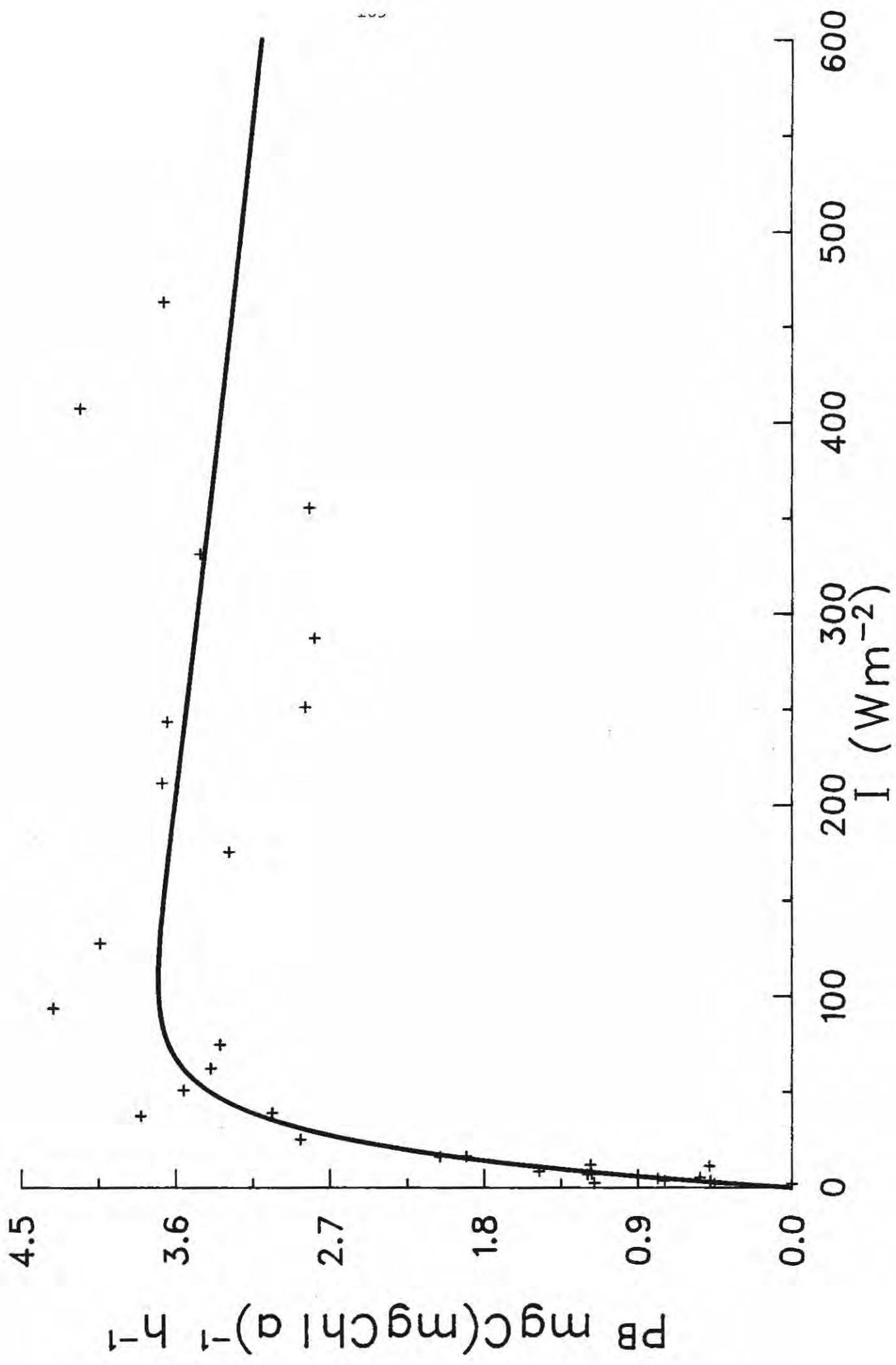


ID 8407970 STA. 13 09/12/84 20 M

104

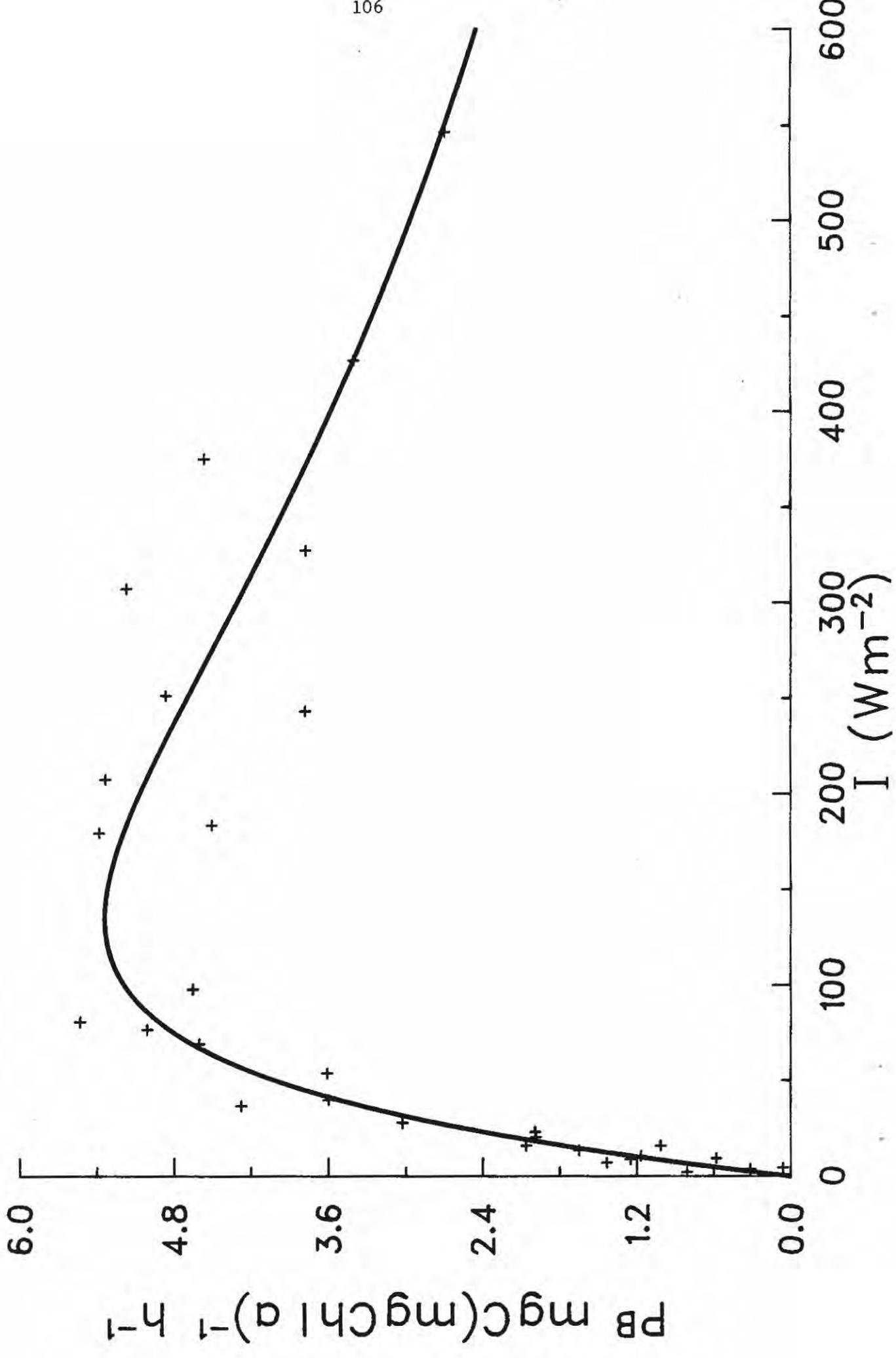


ID 8407971 STA. 13 09/12/84 10 M



ID 8407984 STA. 15 10/12/84 30 M

106

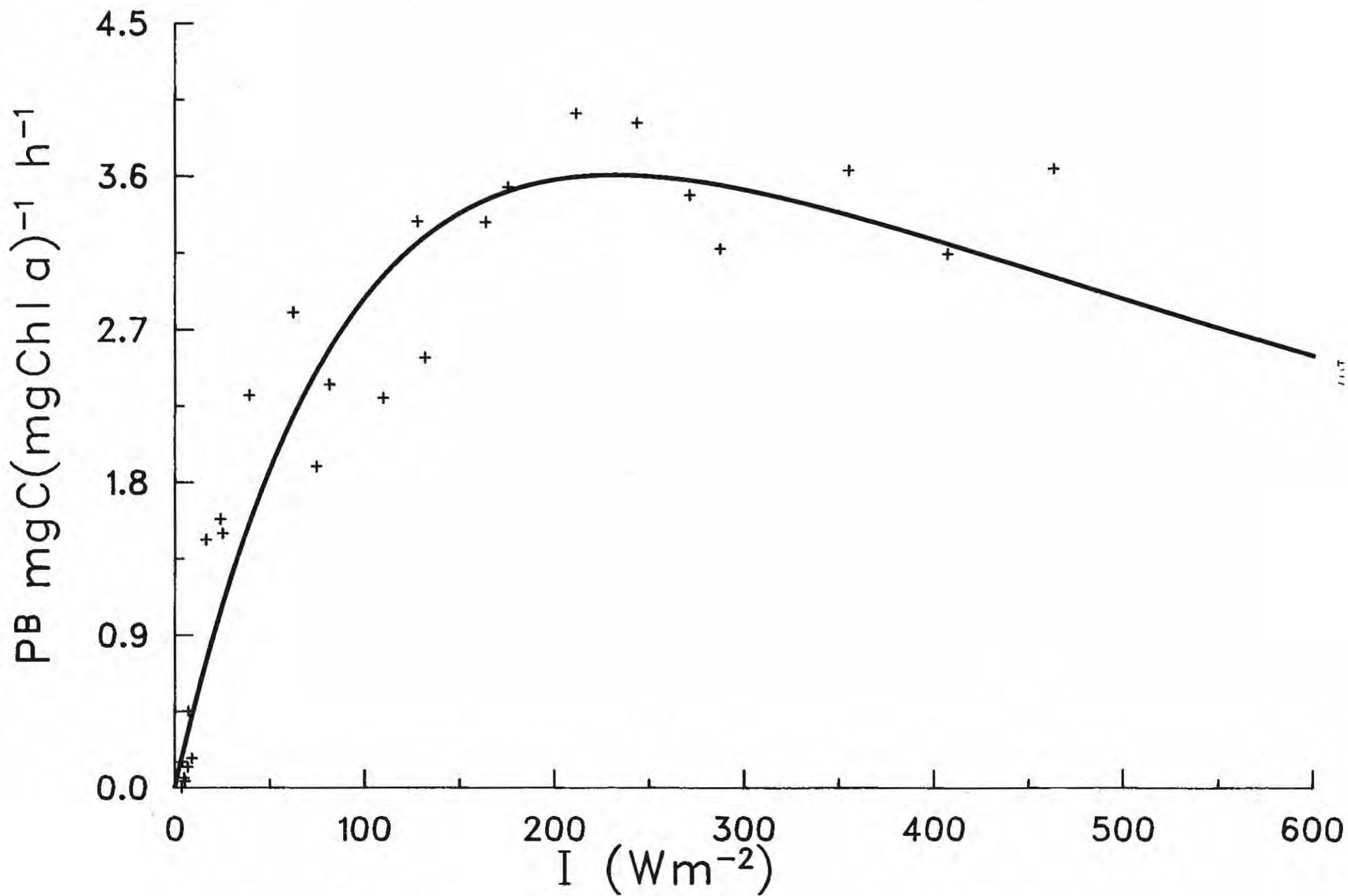


ID 8407985

STA. 15

10/12/84

20 M

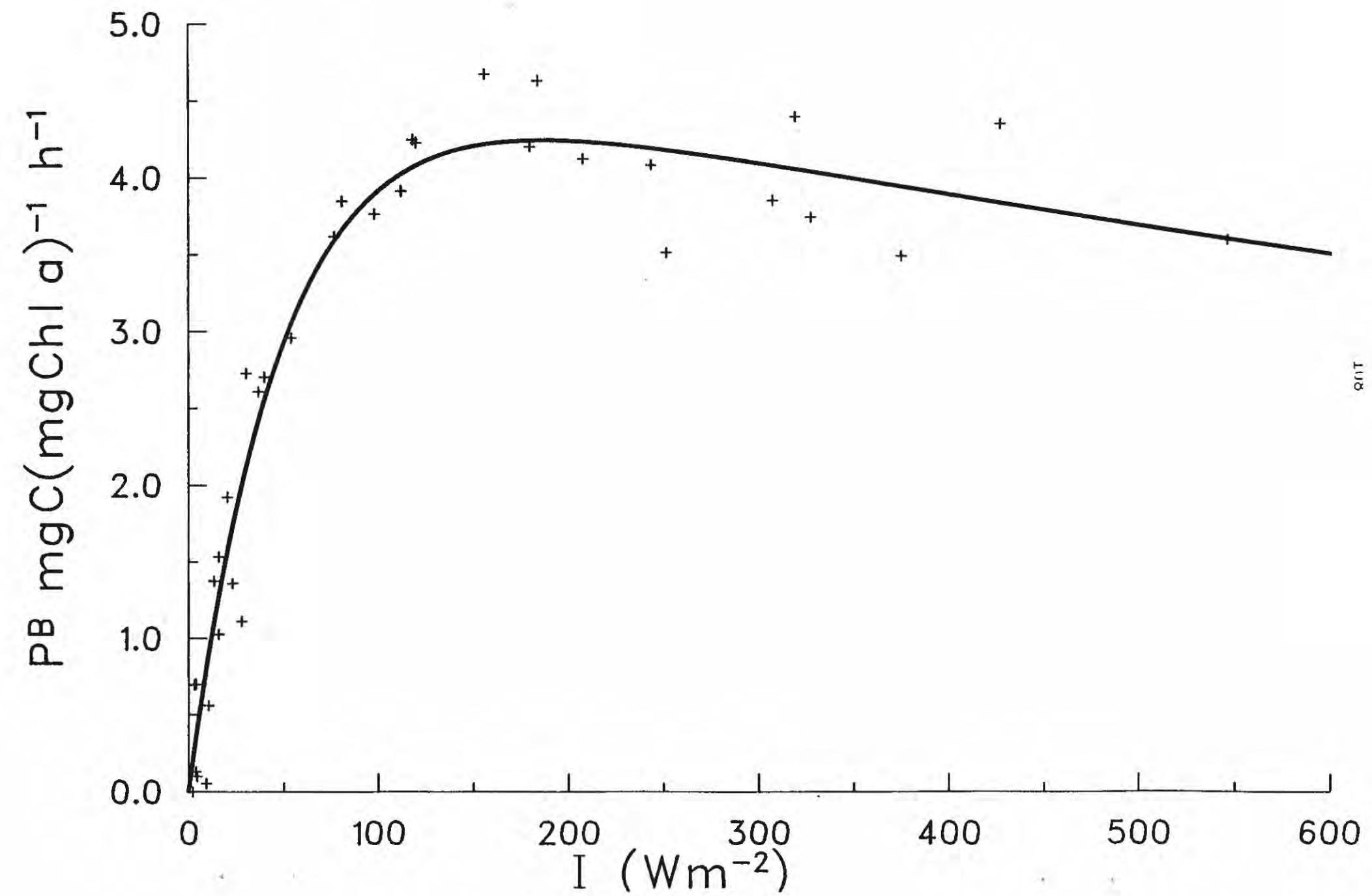


ID 8407986

STA. 15

10/12/84

10 M

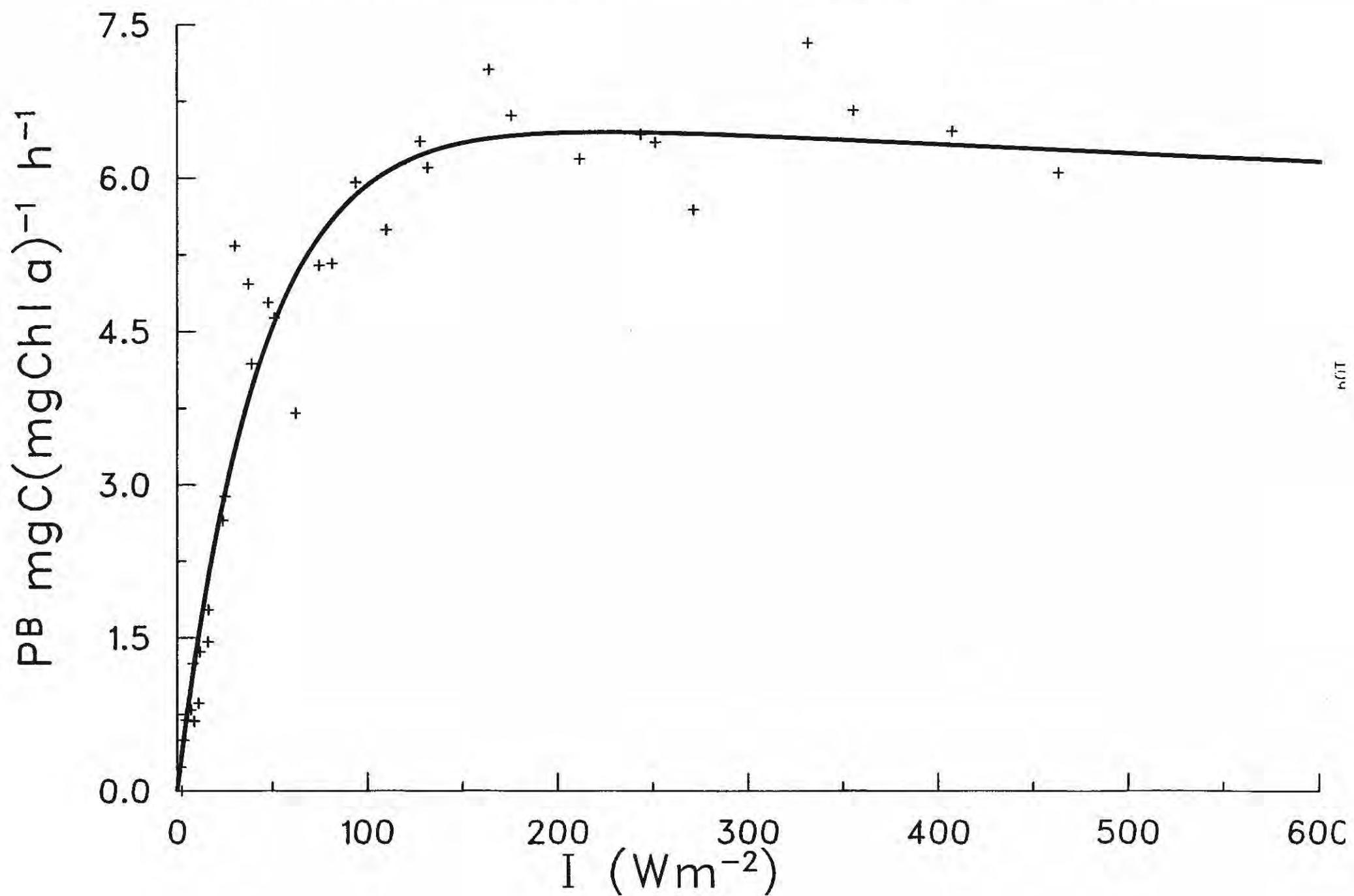


ID 8407987

STA. 15

10/12/84

5 M

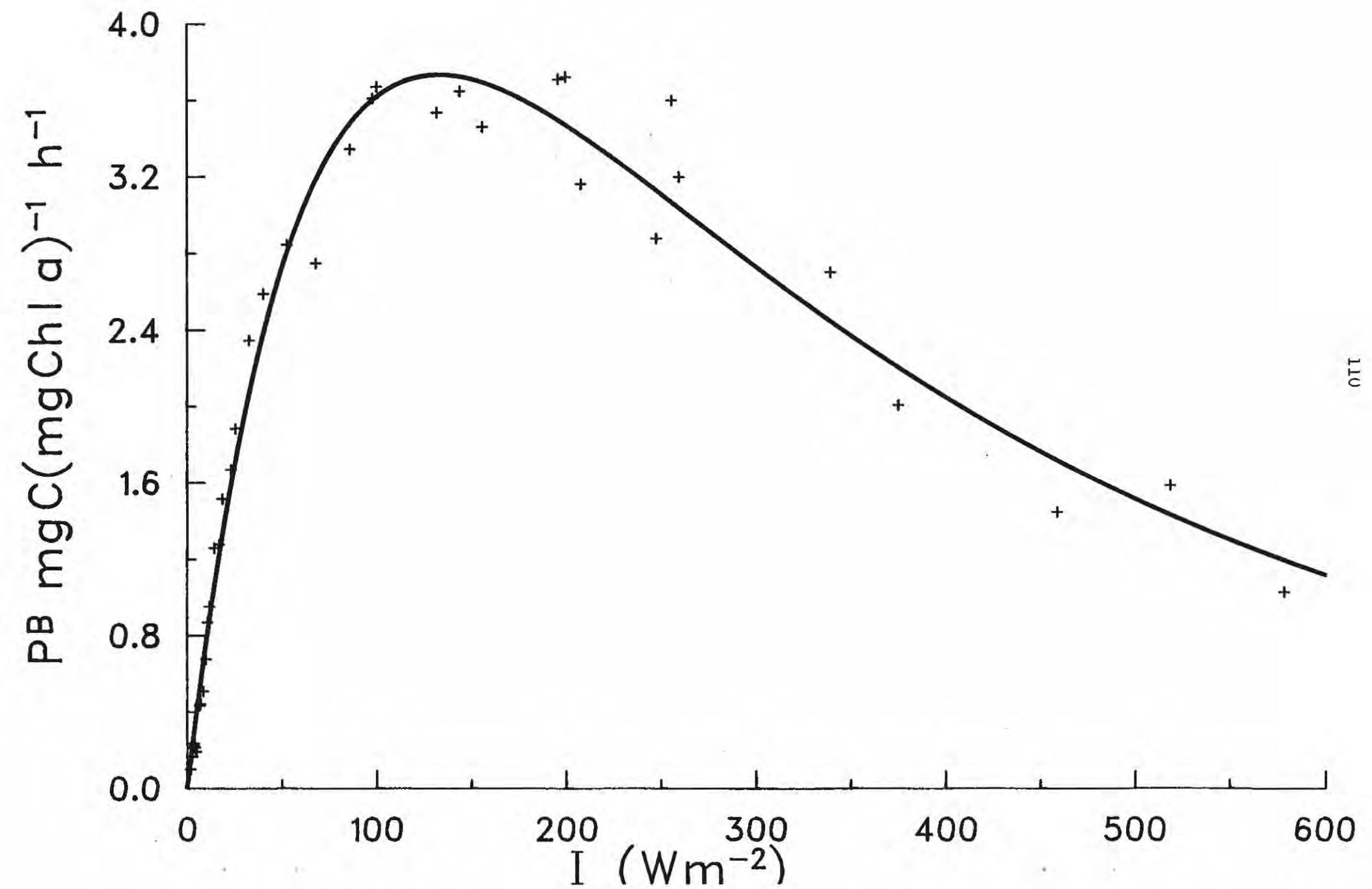


ID 8408188

STA. 25

15/12/84

20 M

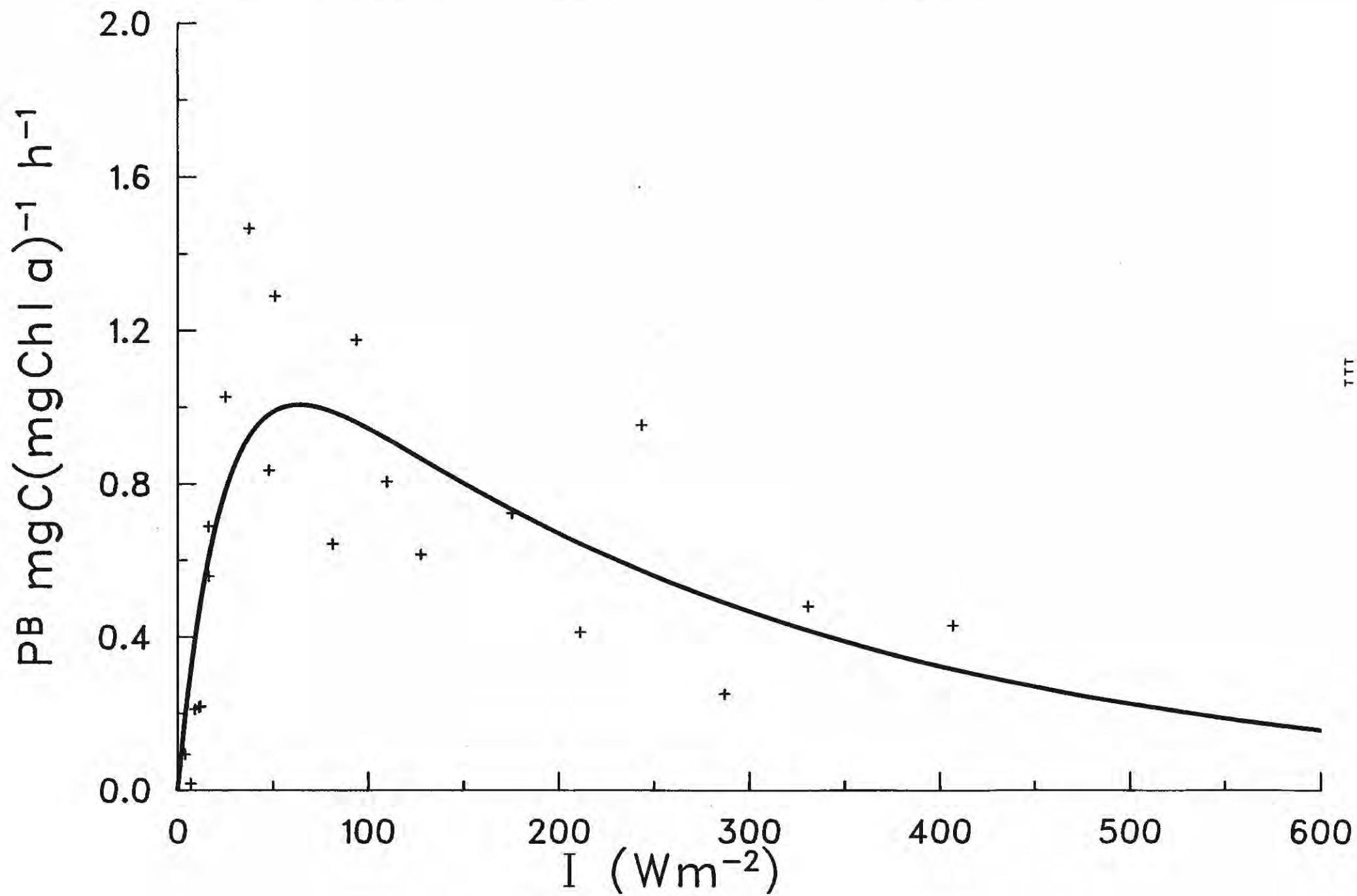


ID 8403457

STA. 17

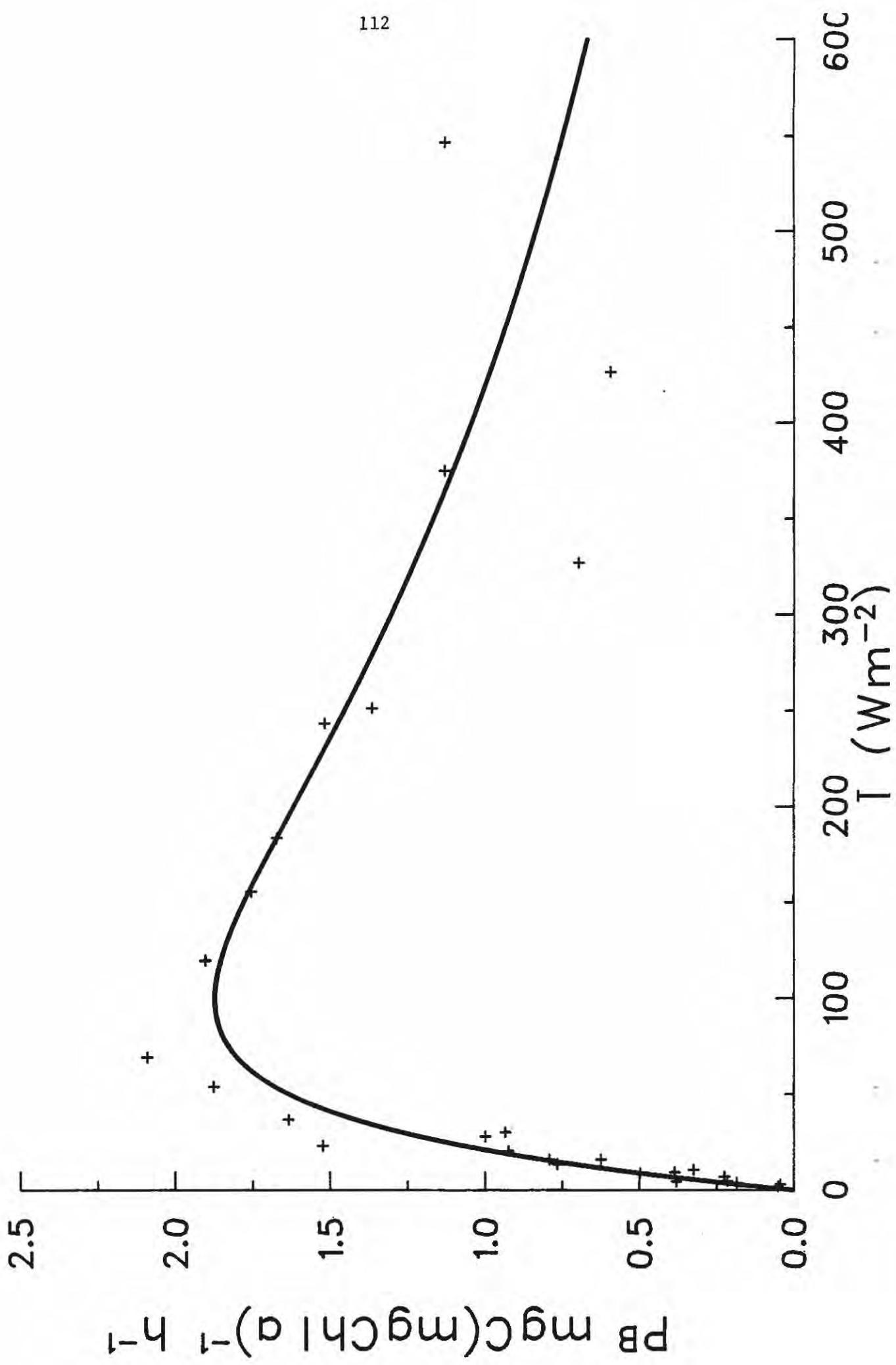
11/12/84

20 M



ID 8403458 STA. 17 11/12/84 10 M

112

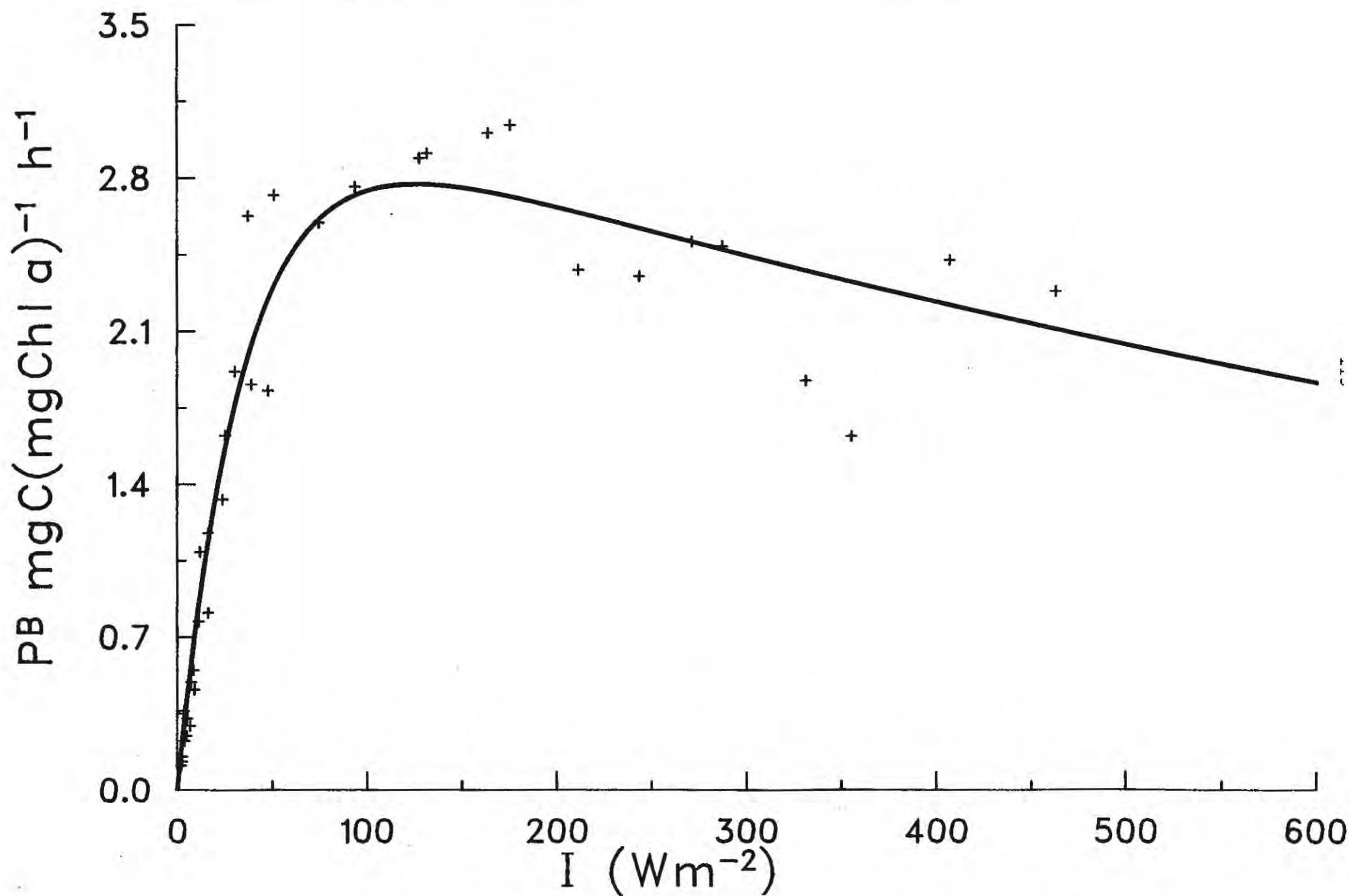


ID 8403459

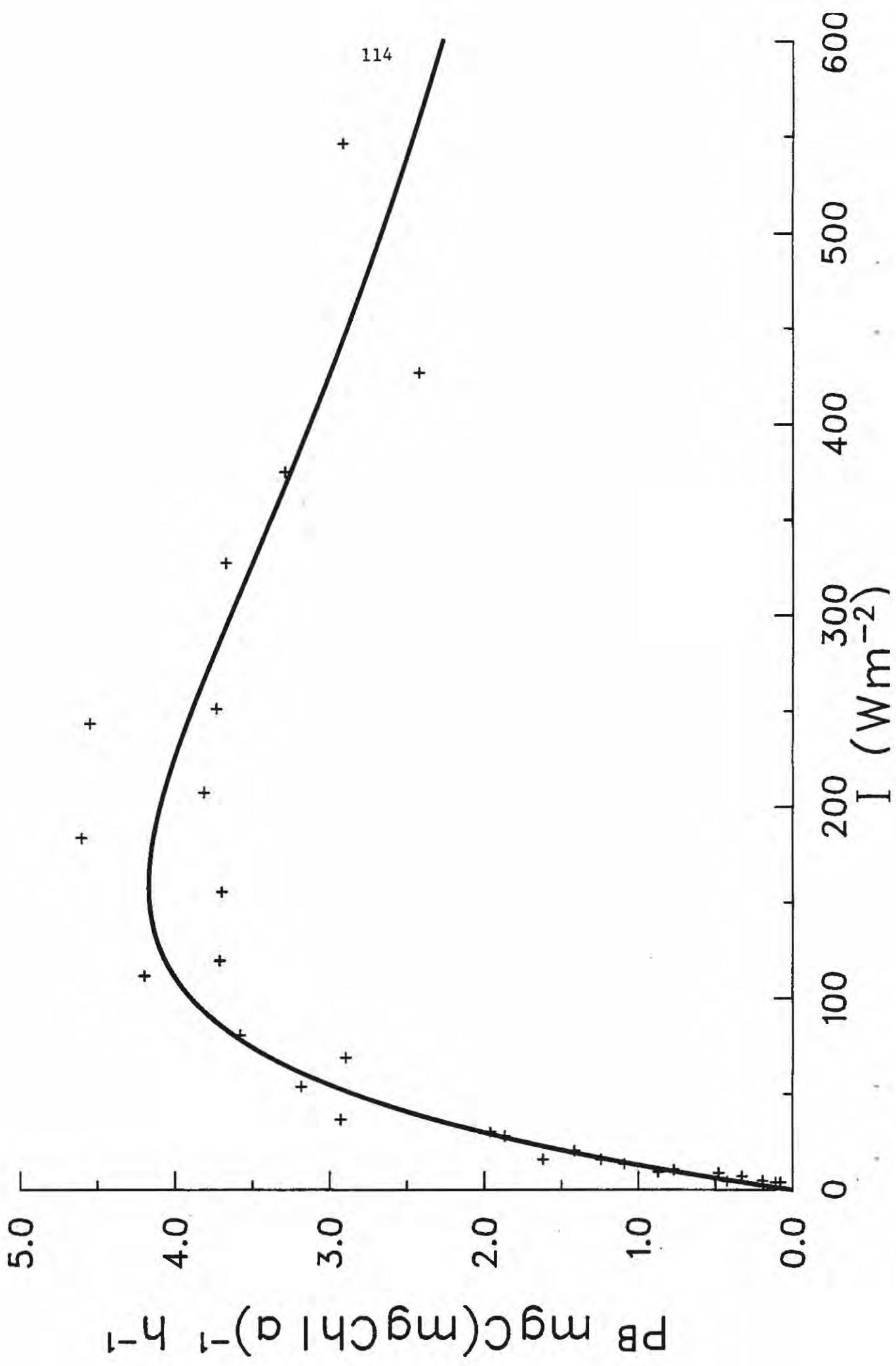
STA. 17

11/12/84

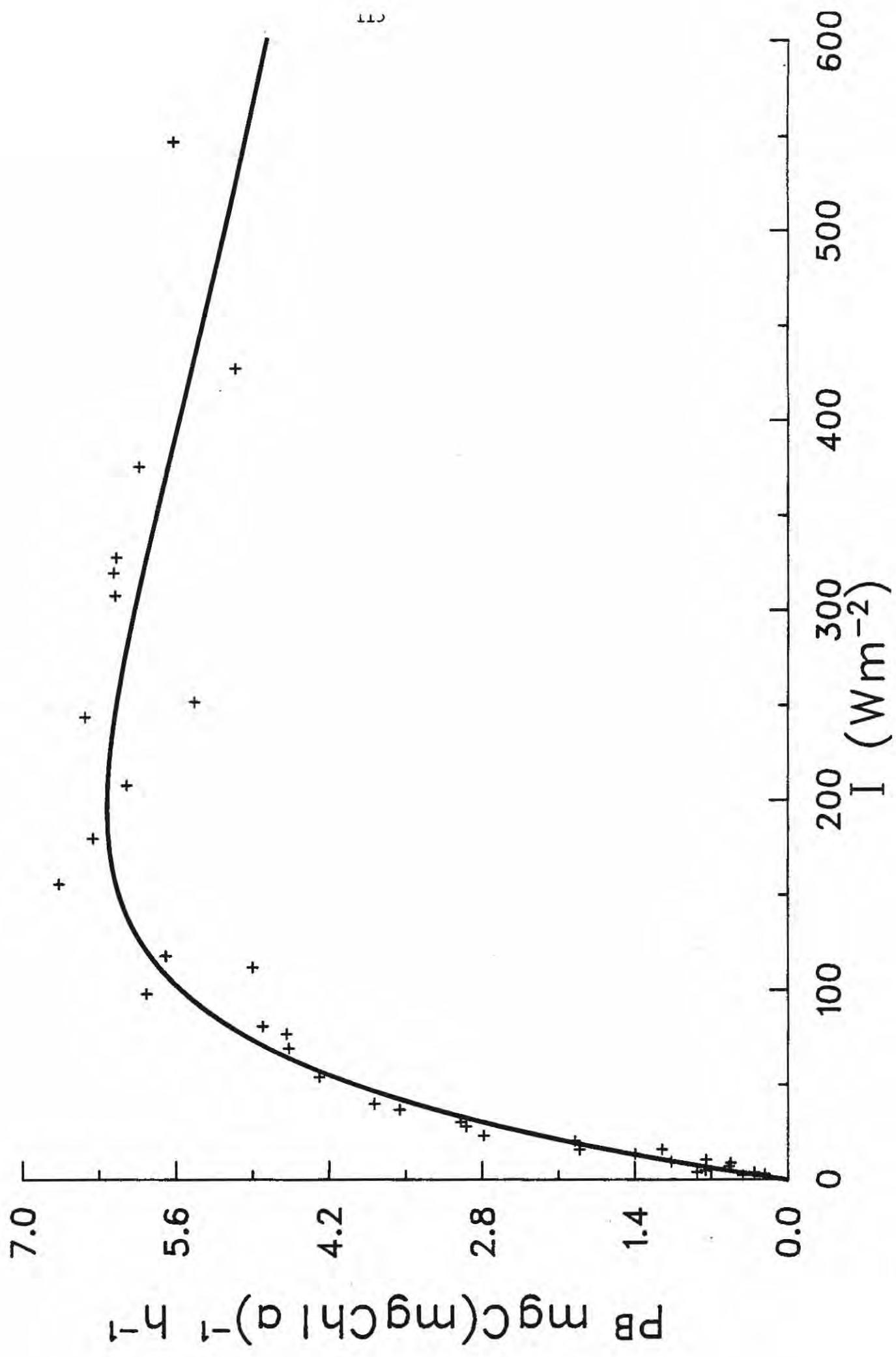
5 M



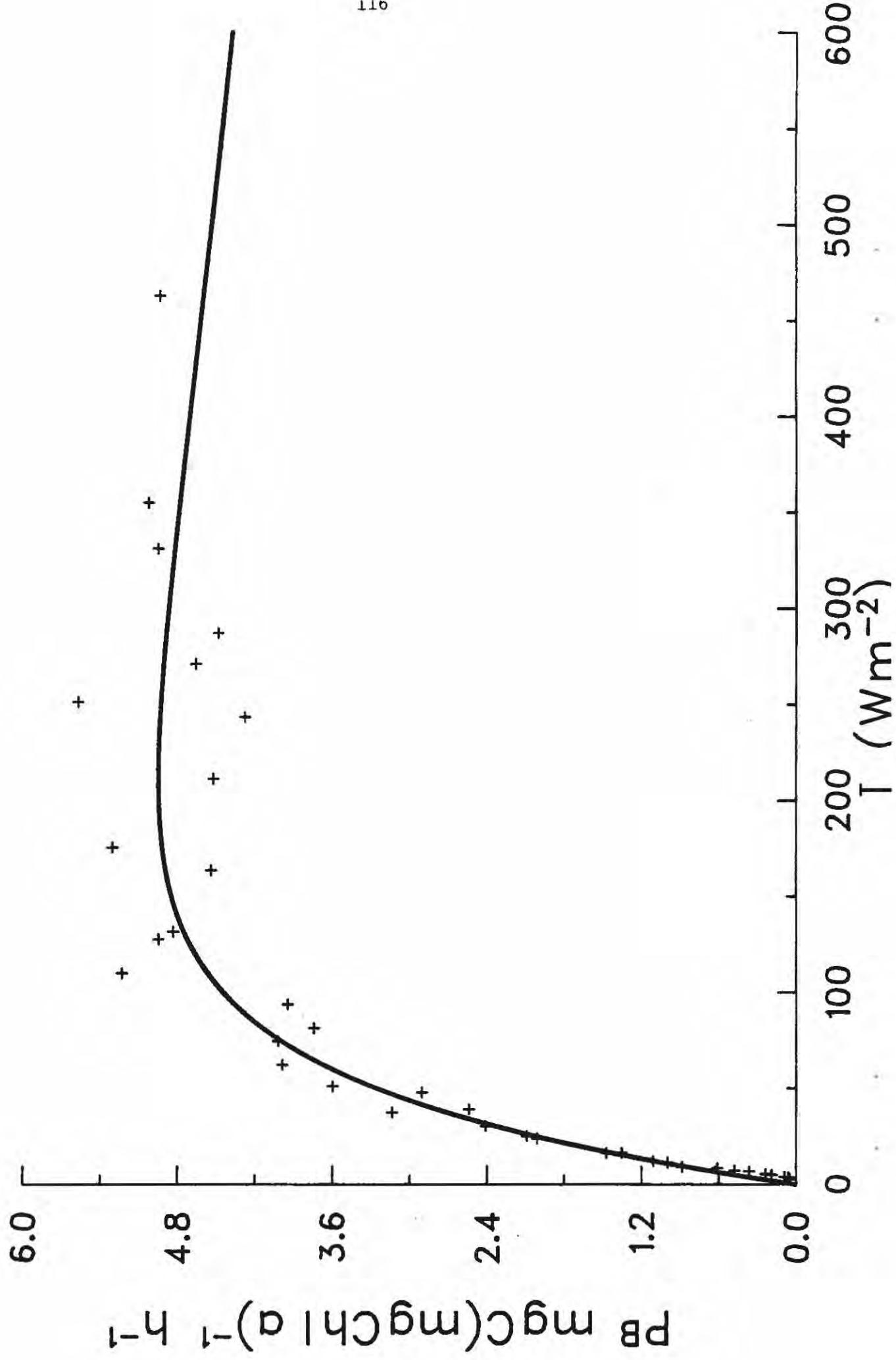
ID 8408000 STA. 17 11/12/84 30 M



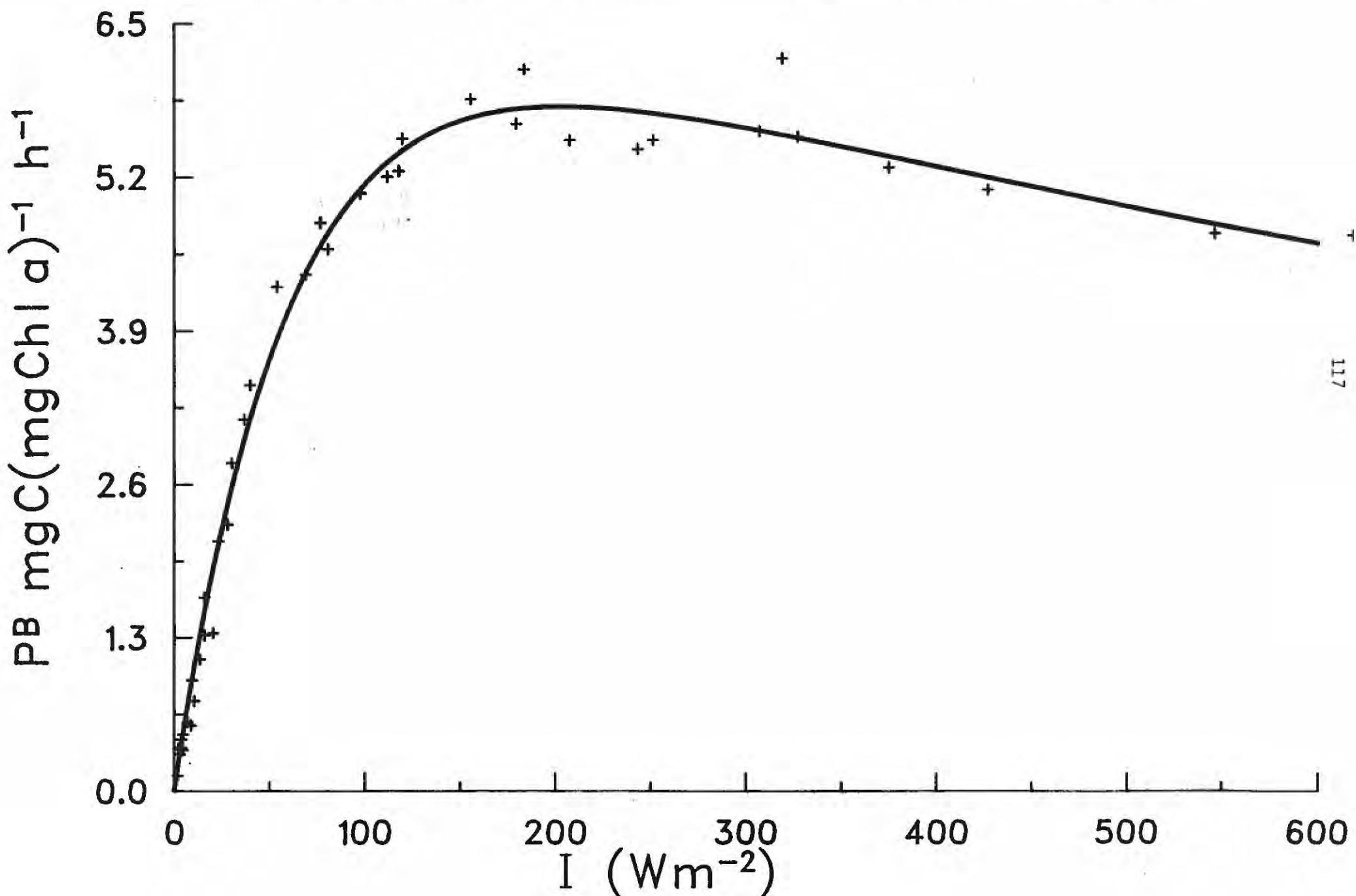
ID 8403468 STA. 19 12/12/84 40 M



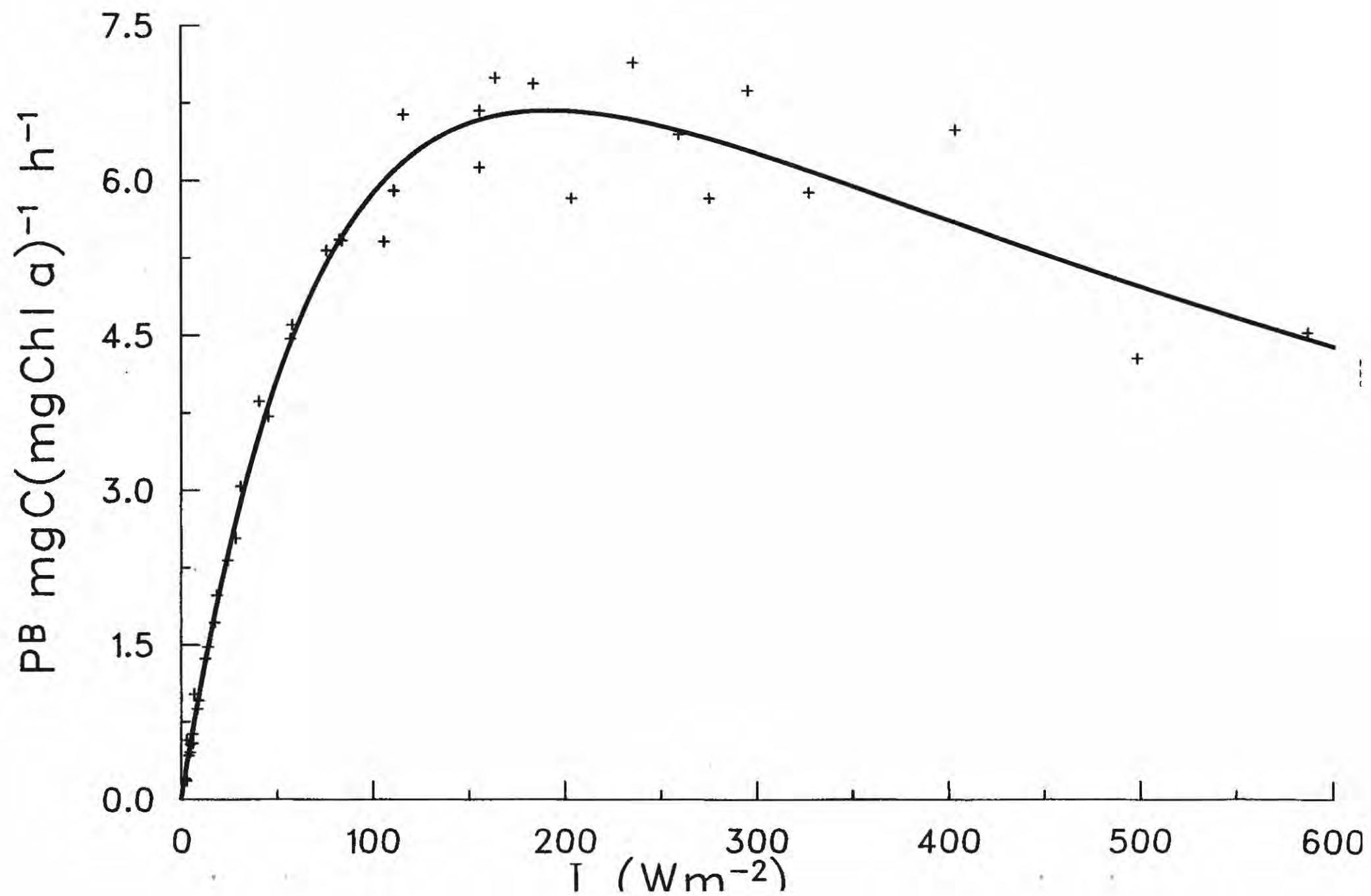
ID 8403469 STA. 19 12/12/84 M



ID 8403470 STA. 19 12/12/84 10 M



ID 8403480 STA. 21 13/12/84 40 M

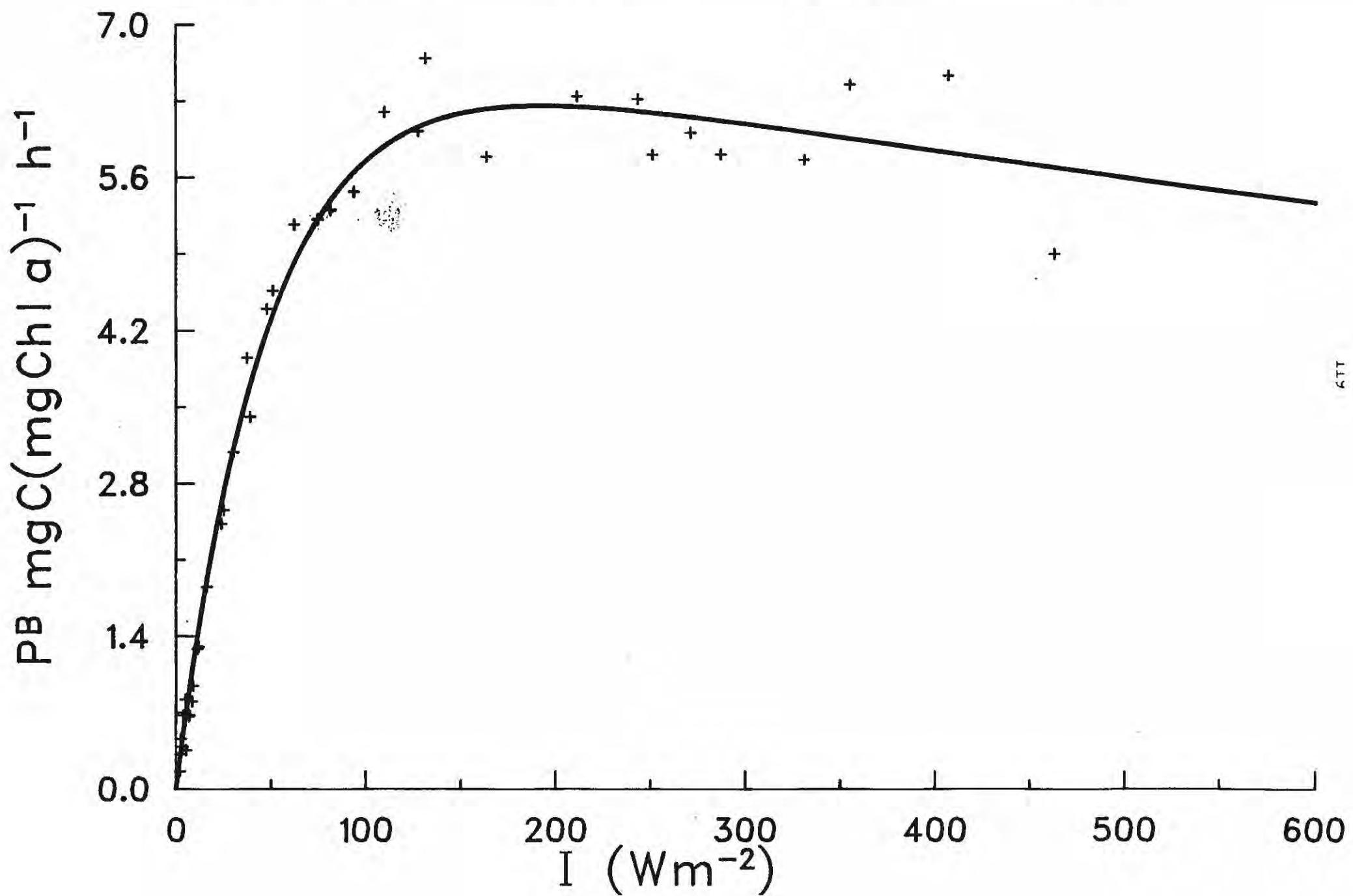


ID 8403471

STA. 19

12/12/84

5 M

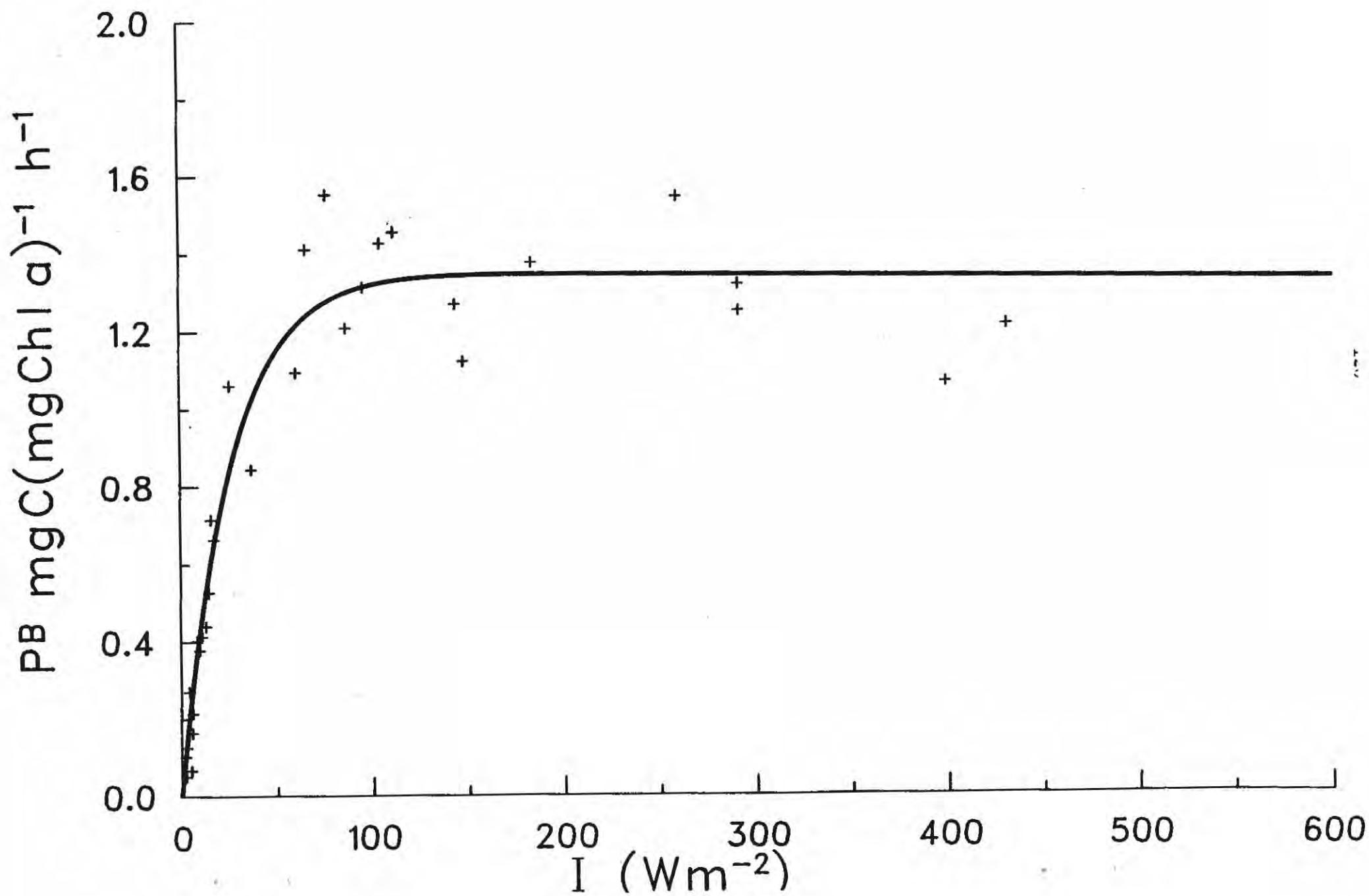


ID 8403481

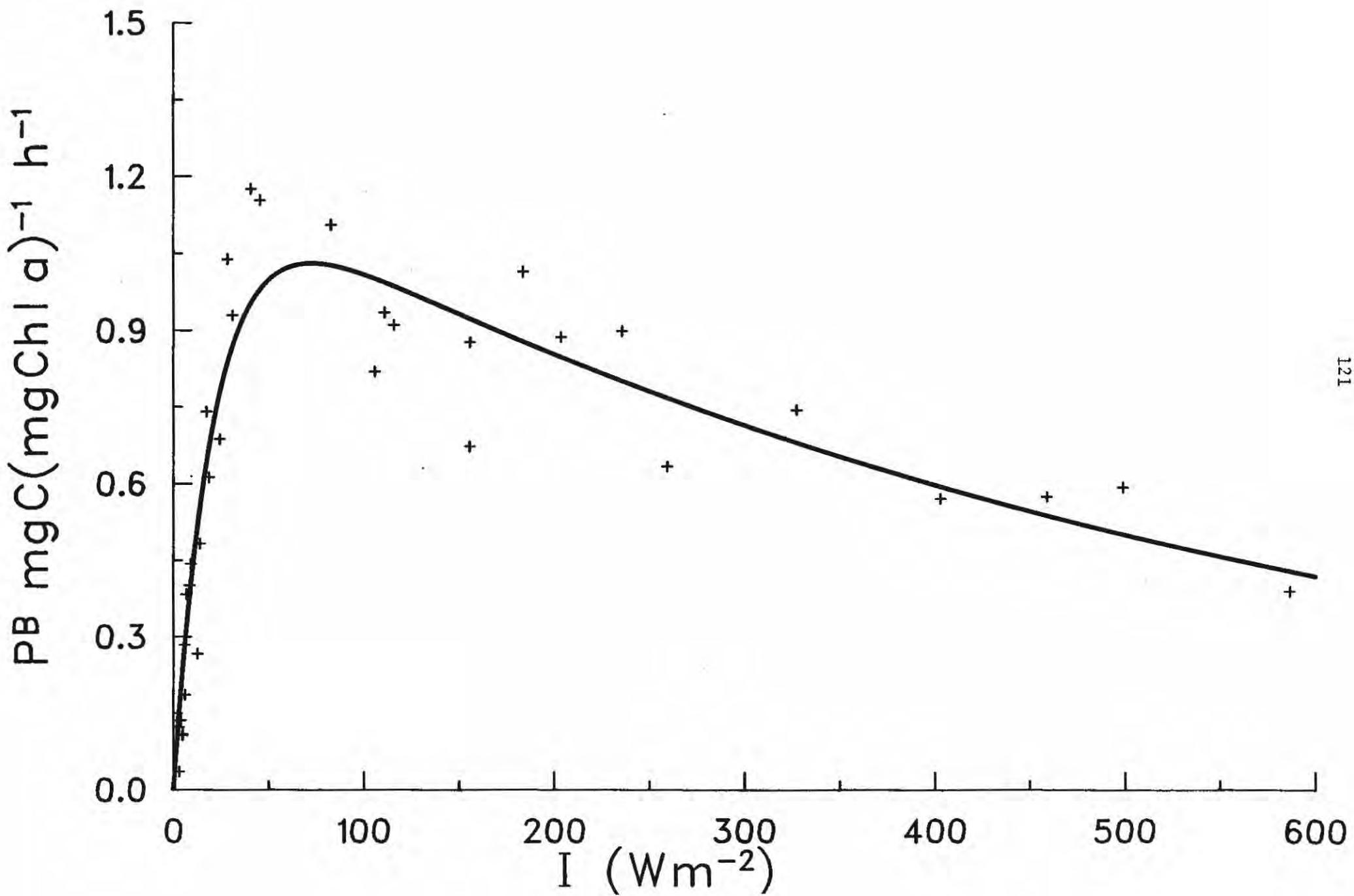
STA. 21

13/12/84

20 M



ID 8403482 STA. 21 13/12/84 10 M

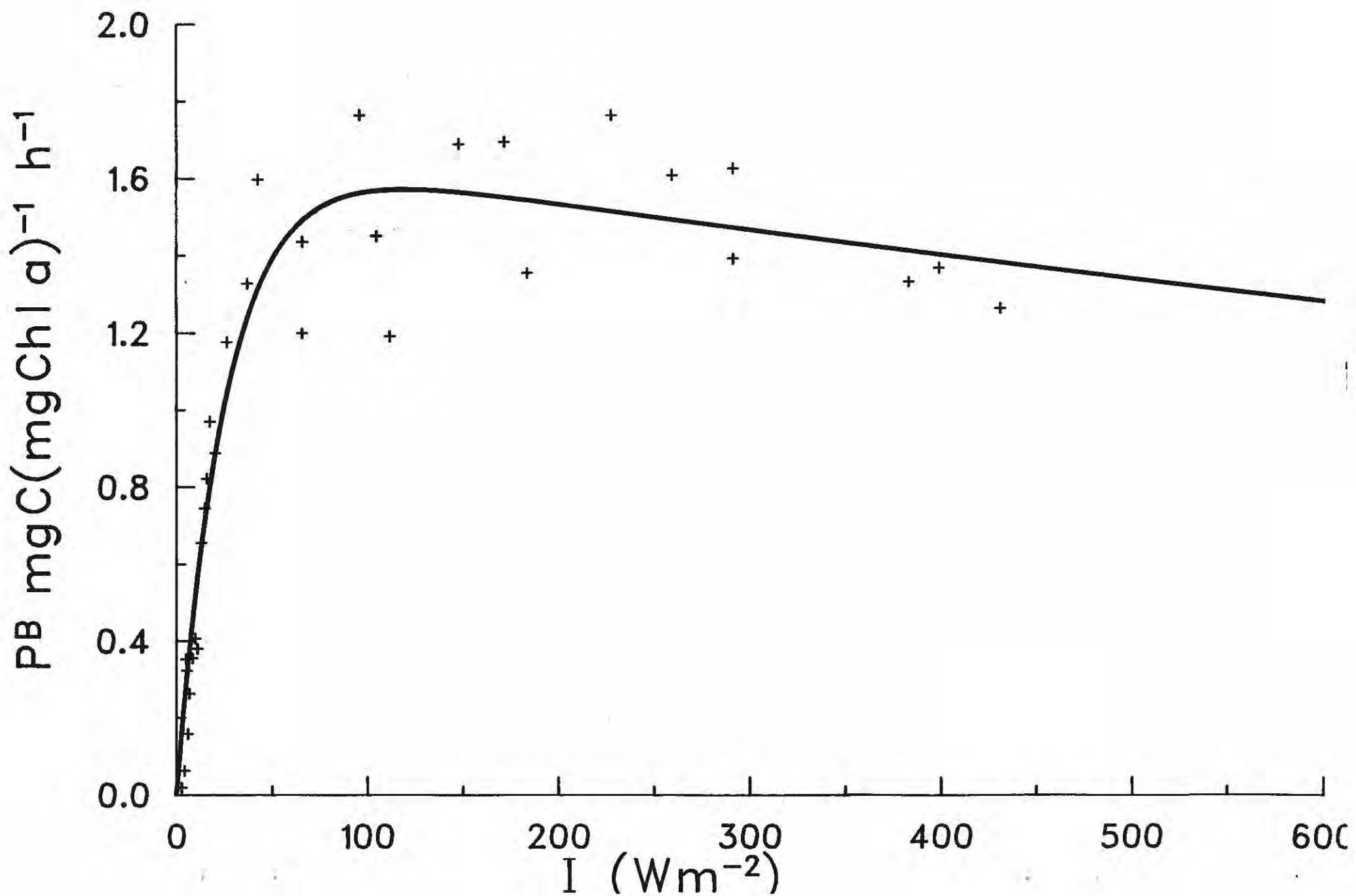


ID 8403483

STA. 21

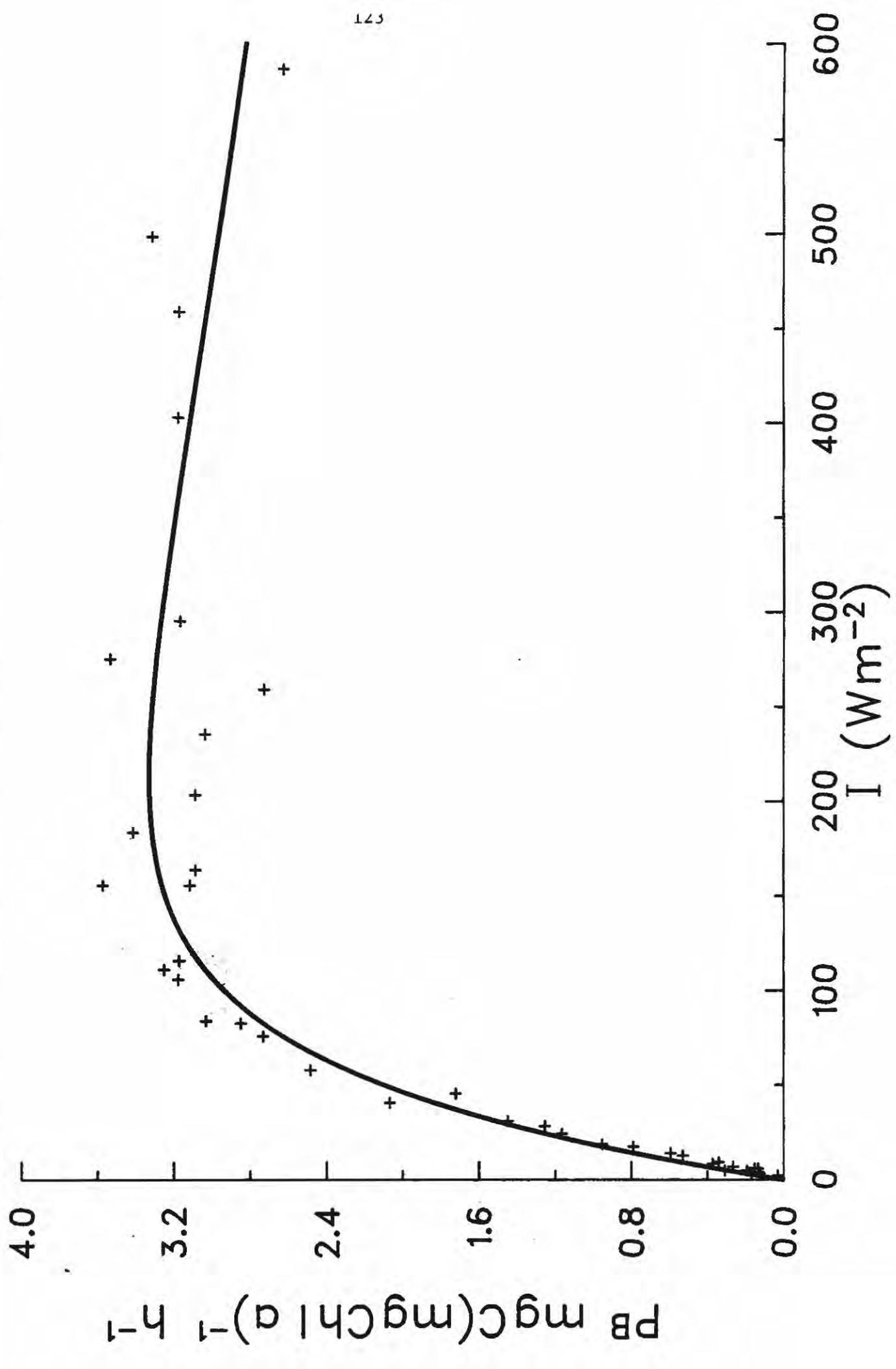
13/12/84

5 M

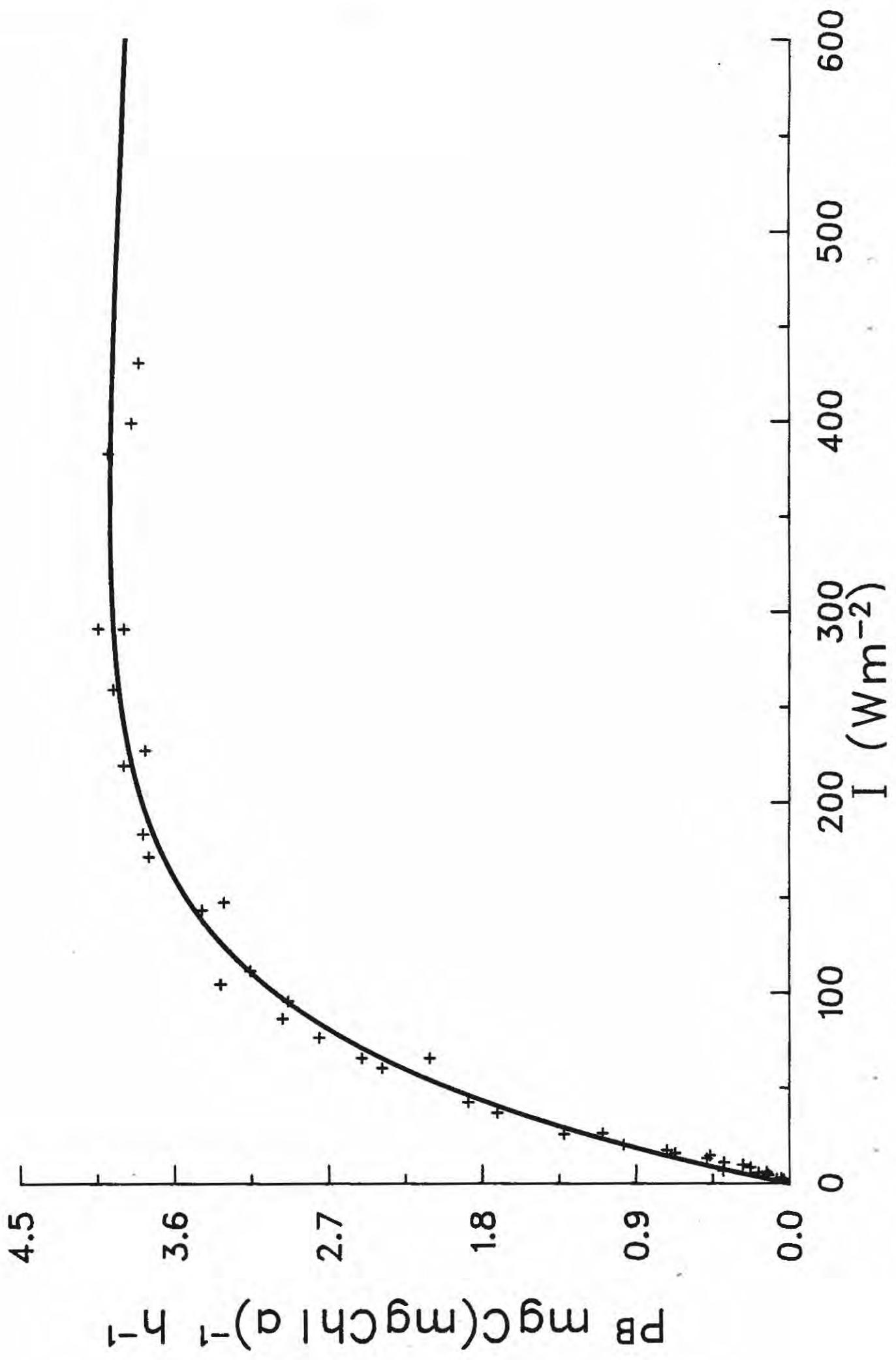


ID 8403490 STA. 22 14/12/84 15 M

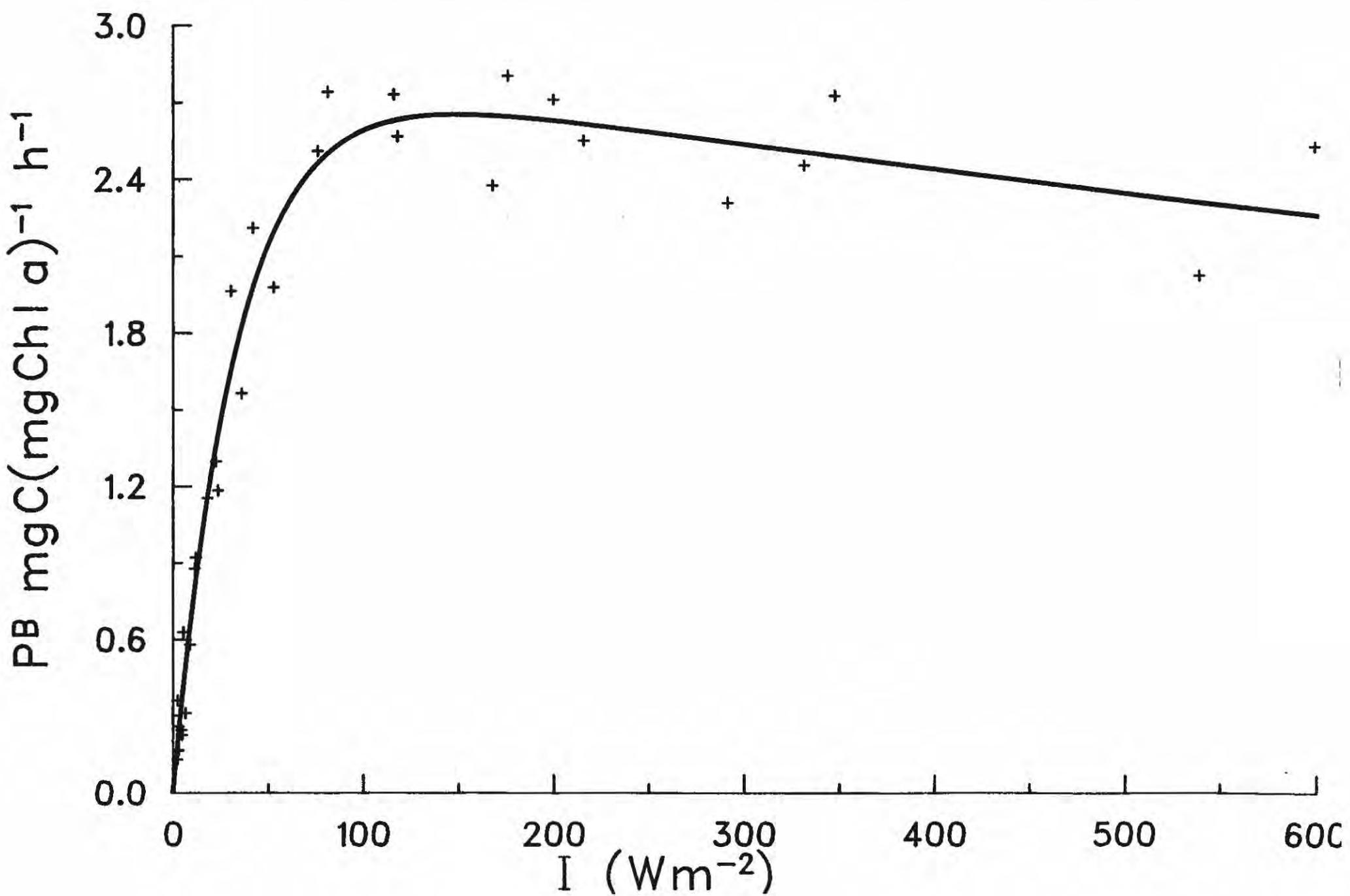
123



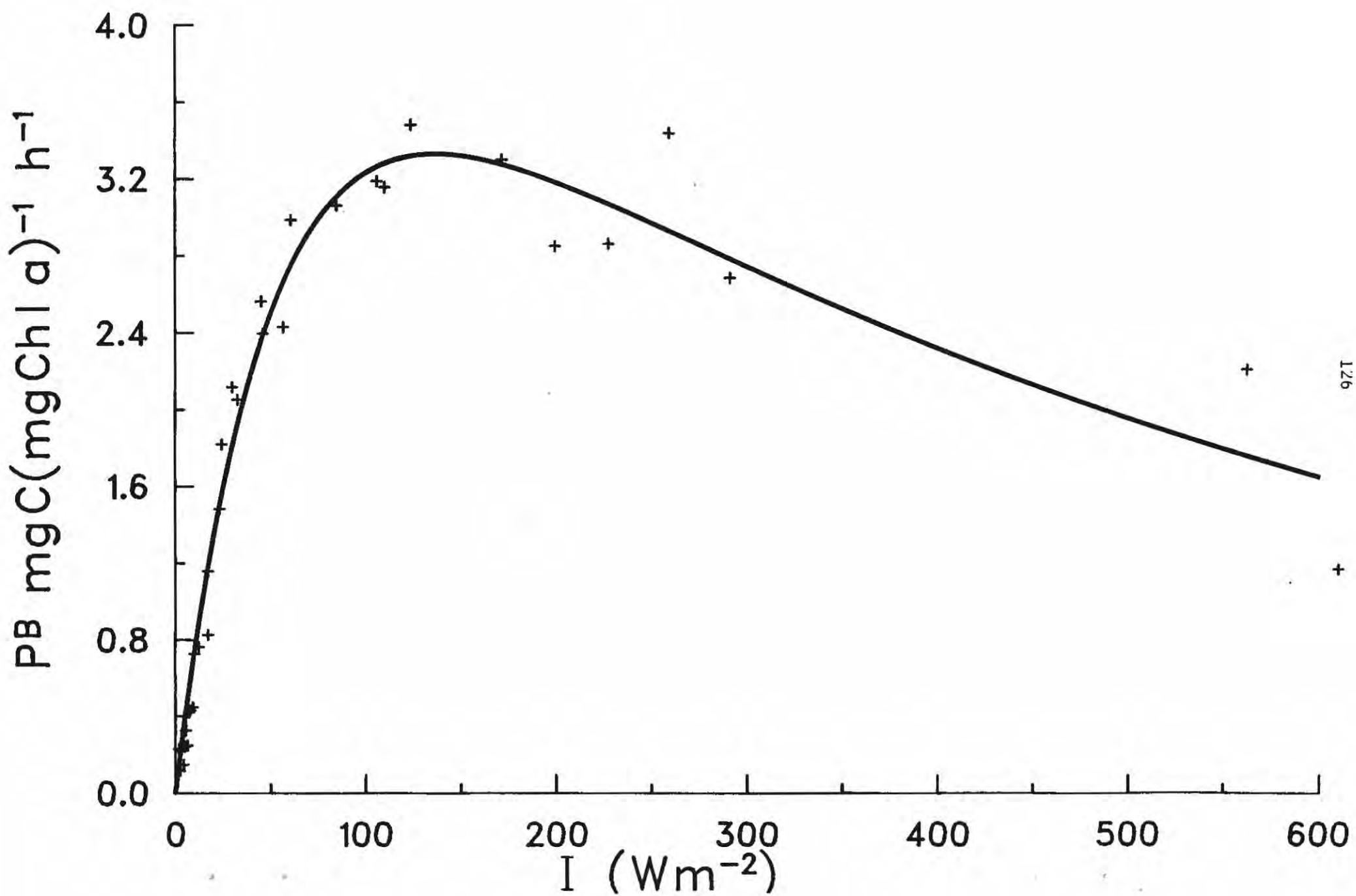
ID 8403491 STA. 22 14/12/84 5 M



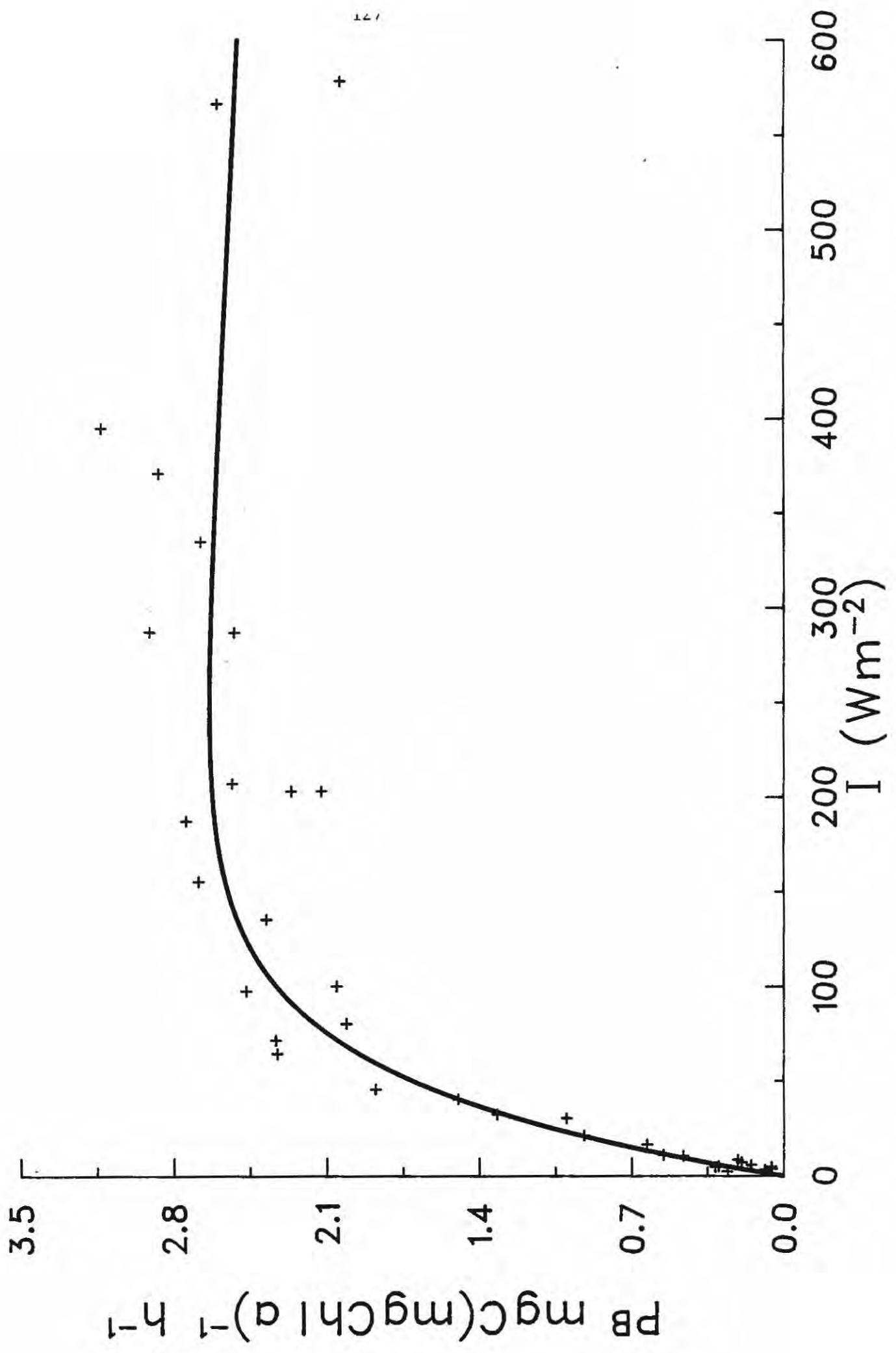
ID 8408161 STA. 23 14/12/84 50 M



ID 8408162 STA. 23 14/12/84 5 M



ID 8408174 STA. 24 15/12/84 5 M

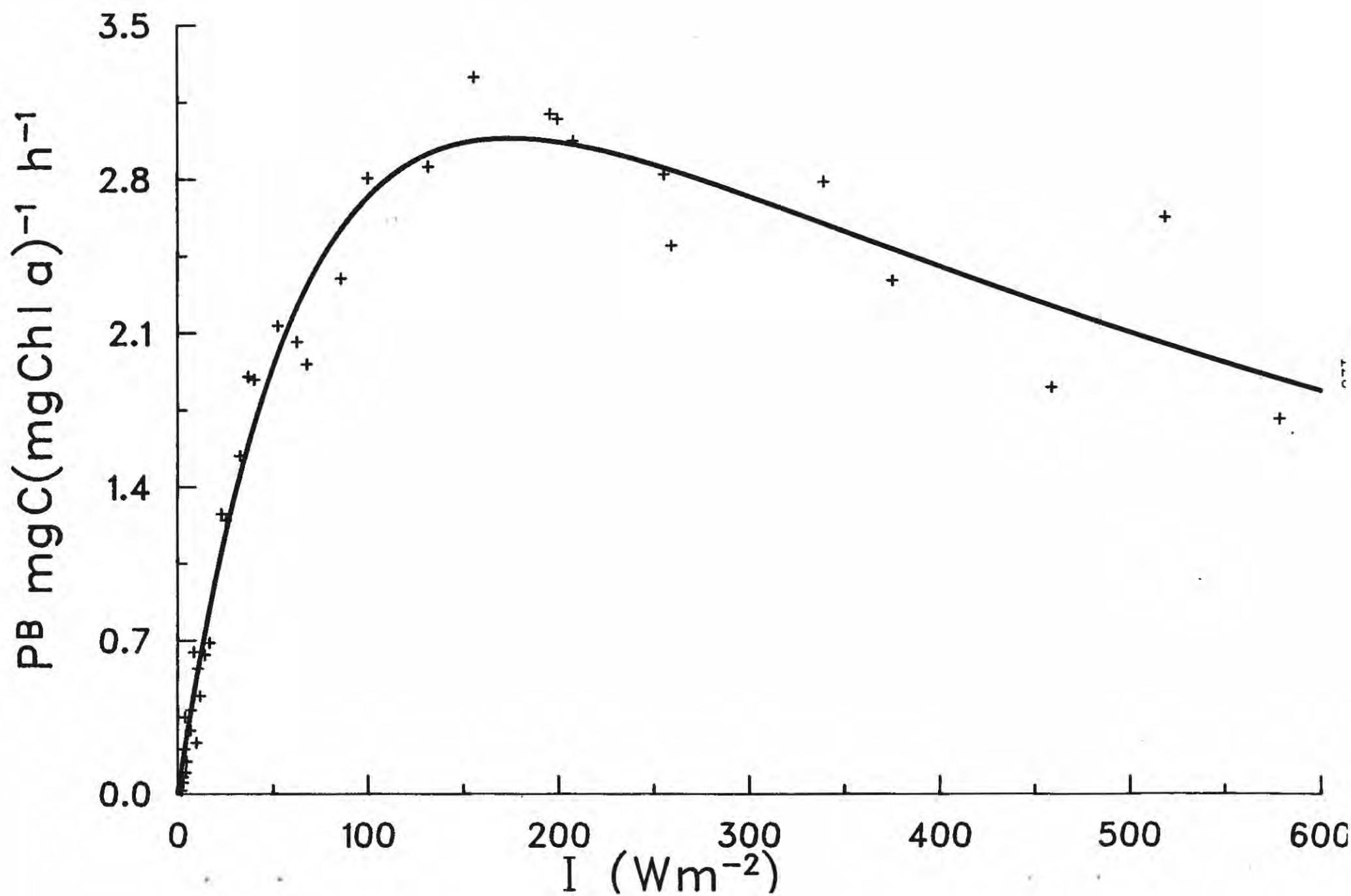


ID 8408173

STA. 24

15/12/84

10 M

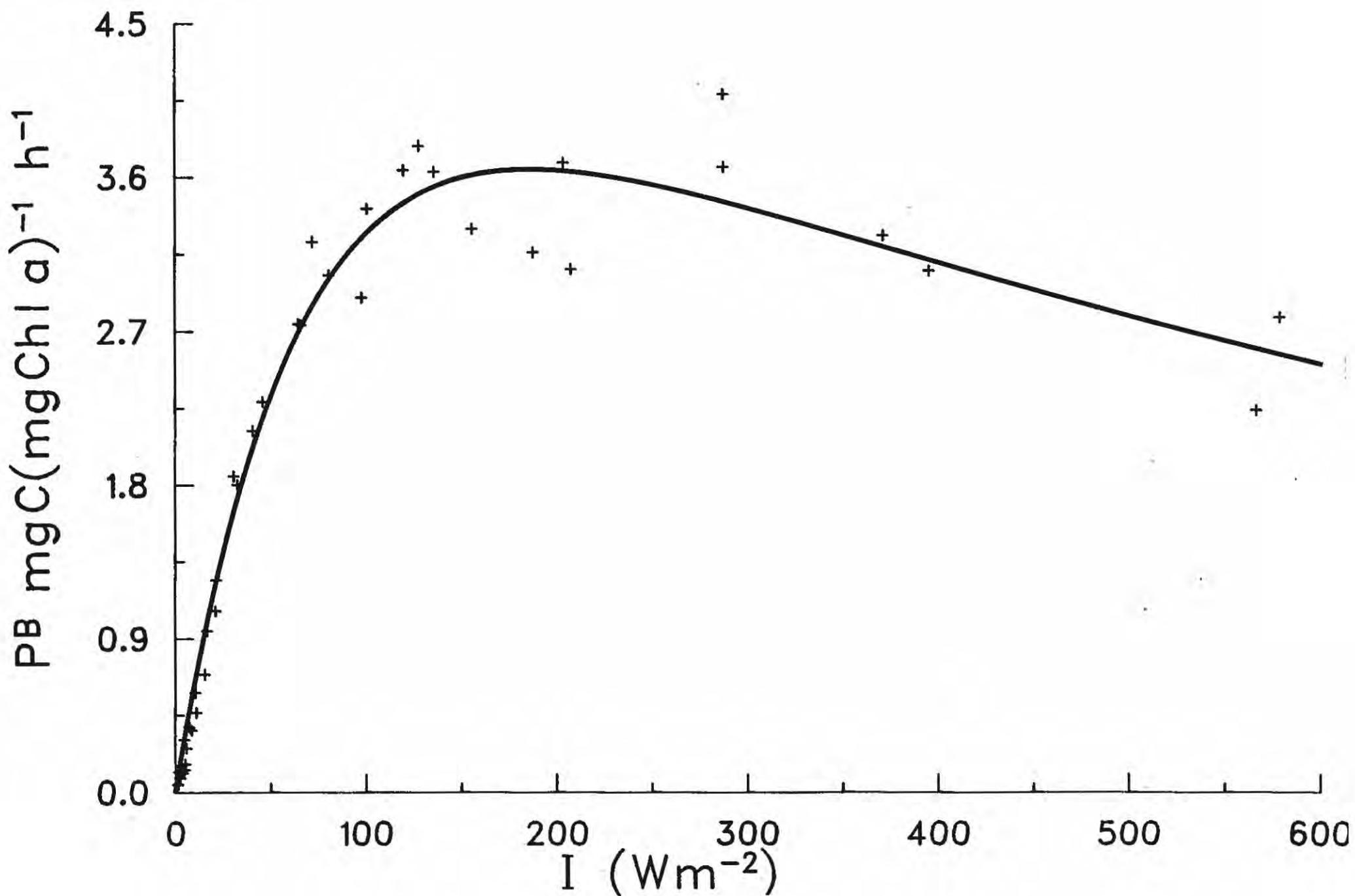


ID 8408189

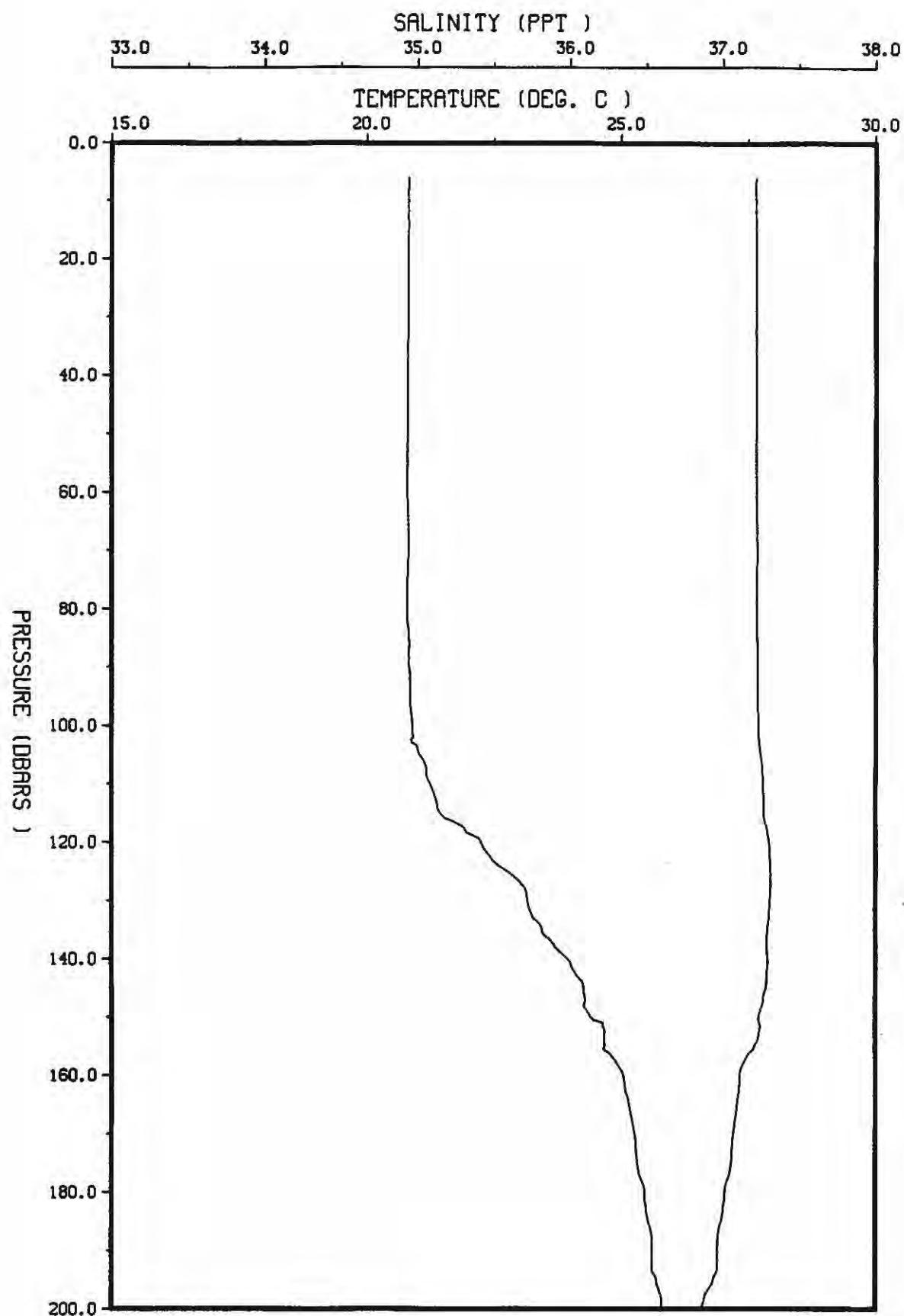
STA. 25

15/12/84

5 M

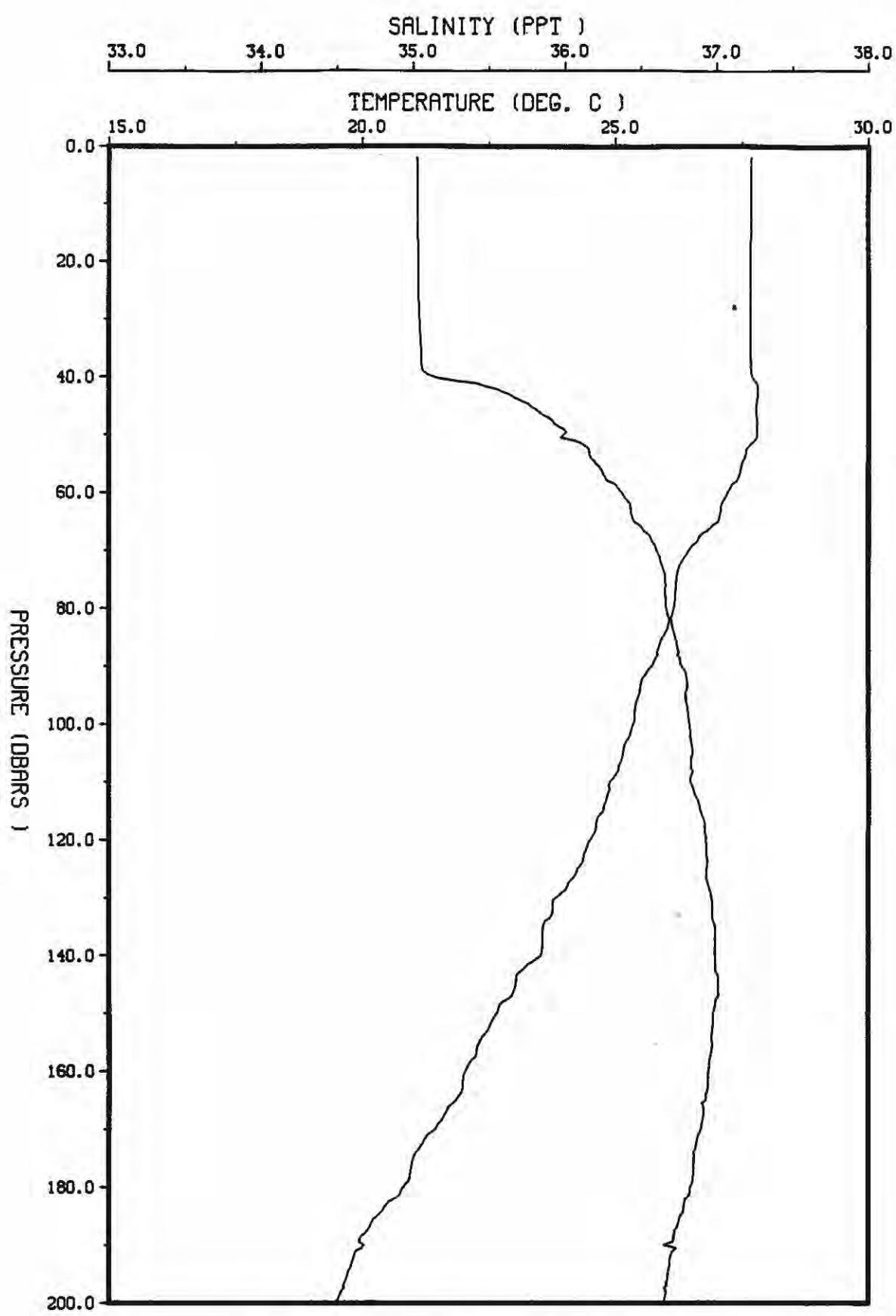


CTD Profiles

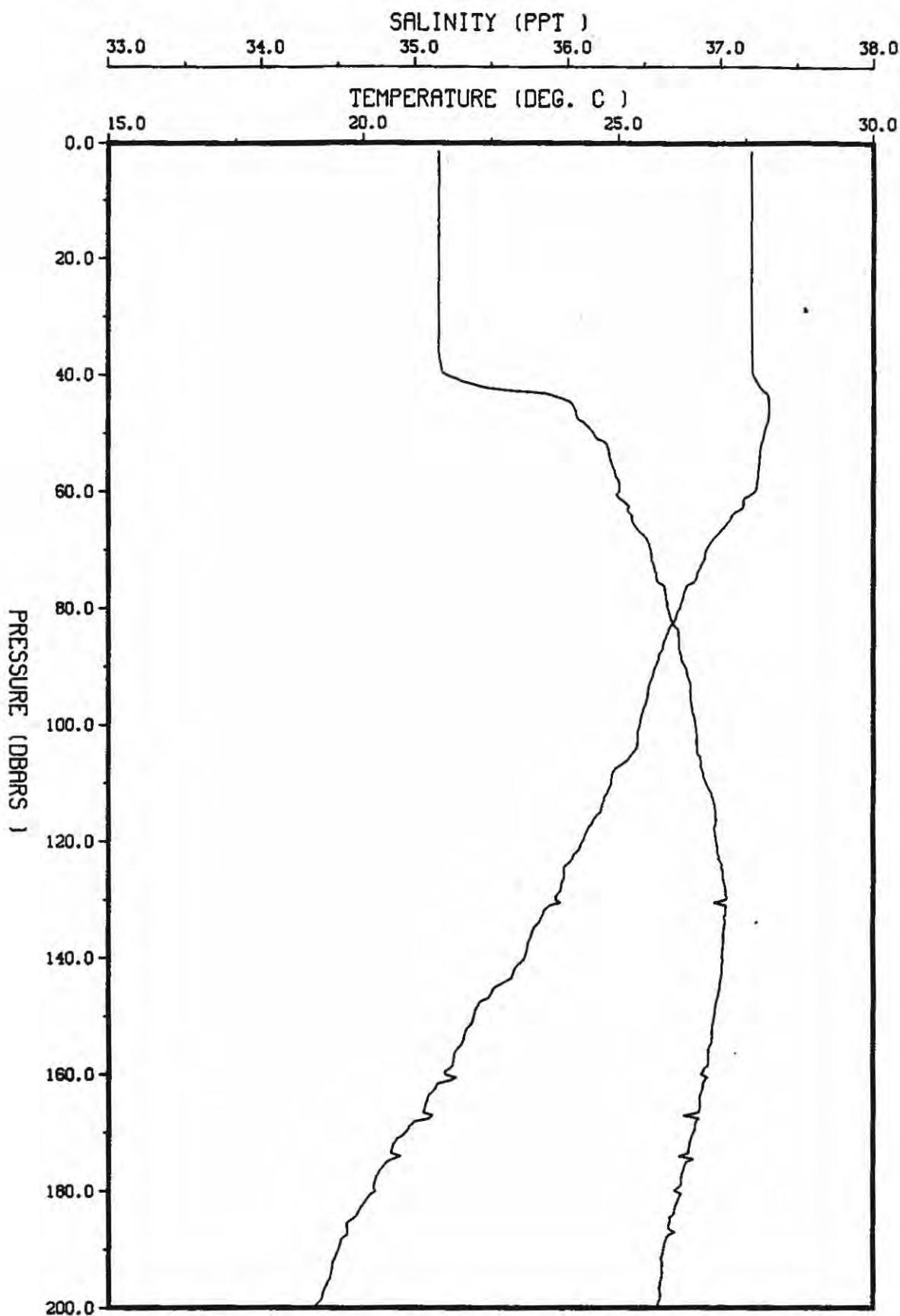


LAT. 14 34.0N, STN 1, CRUISE 84049

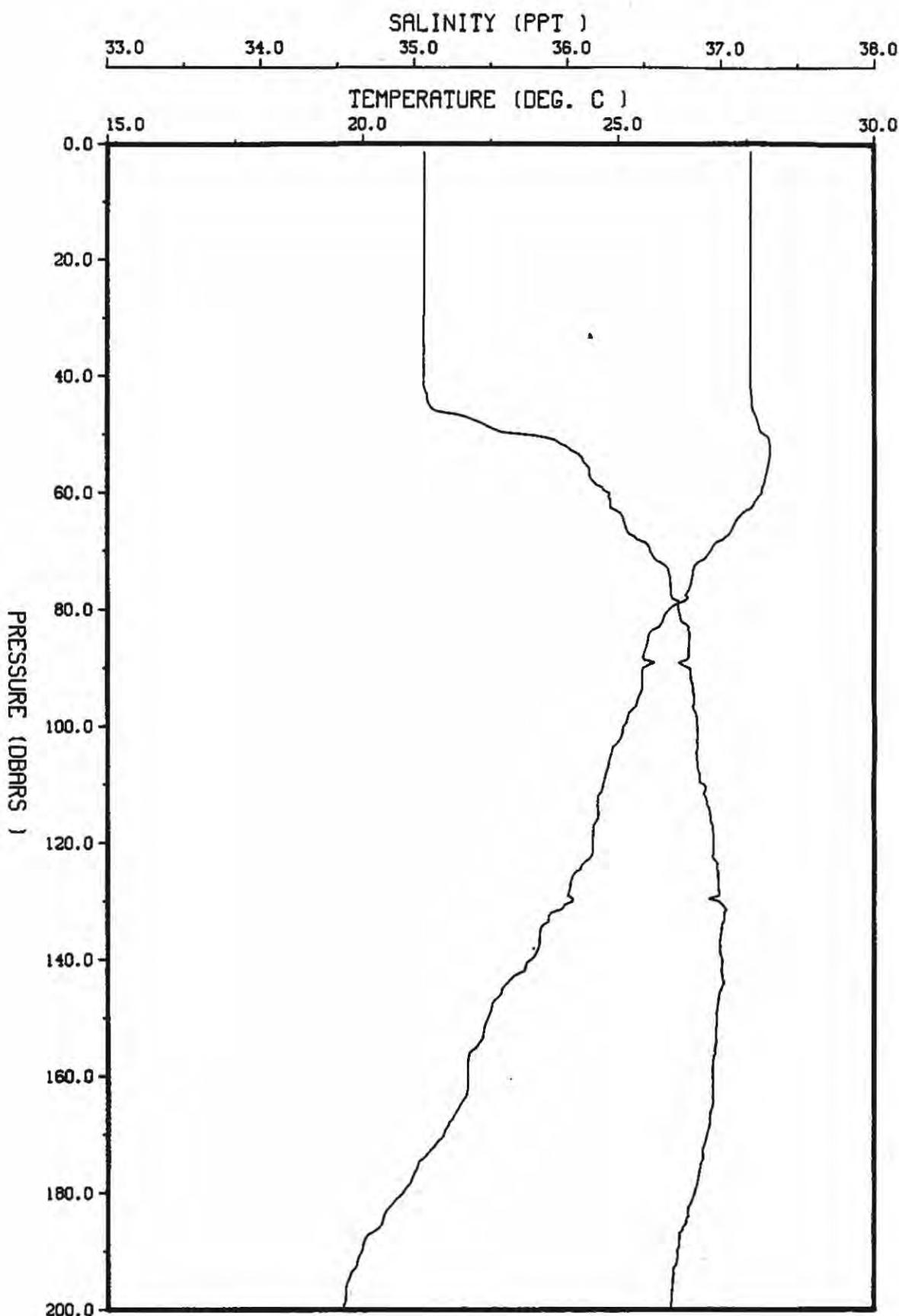
LONG. 64 27.0W, STARTING 8:17GMT, DAY 336, 1984



LAT. 14 40.7N, STN 2, CRUISE 84049
LONG. 64 50.2W, STARTING 10:54GMT, DAY 336, 1984

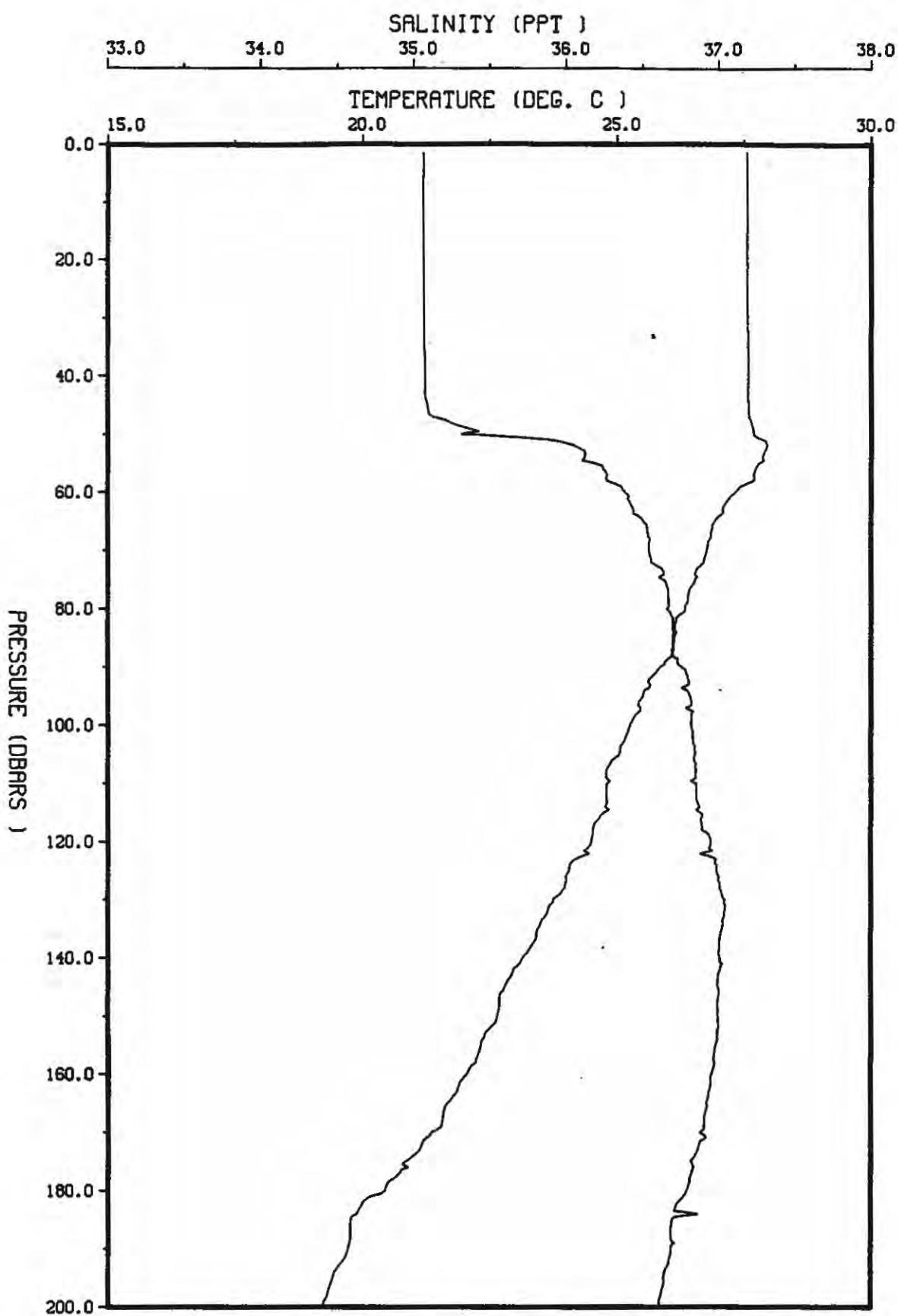


LAT. 14 40.ON, STN 3, CRUISE 84049
LONG. 64 54.OW, STARTING 7:43GMT, DAY 337, 1984



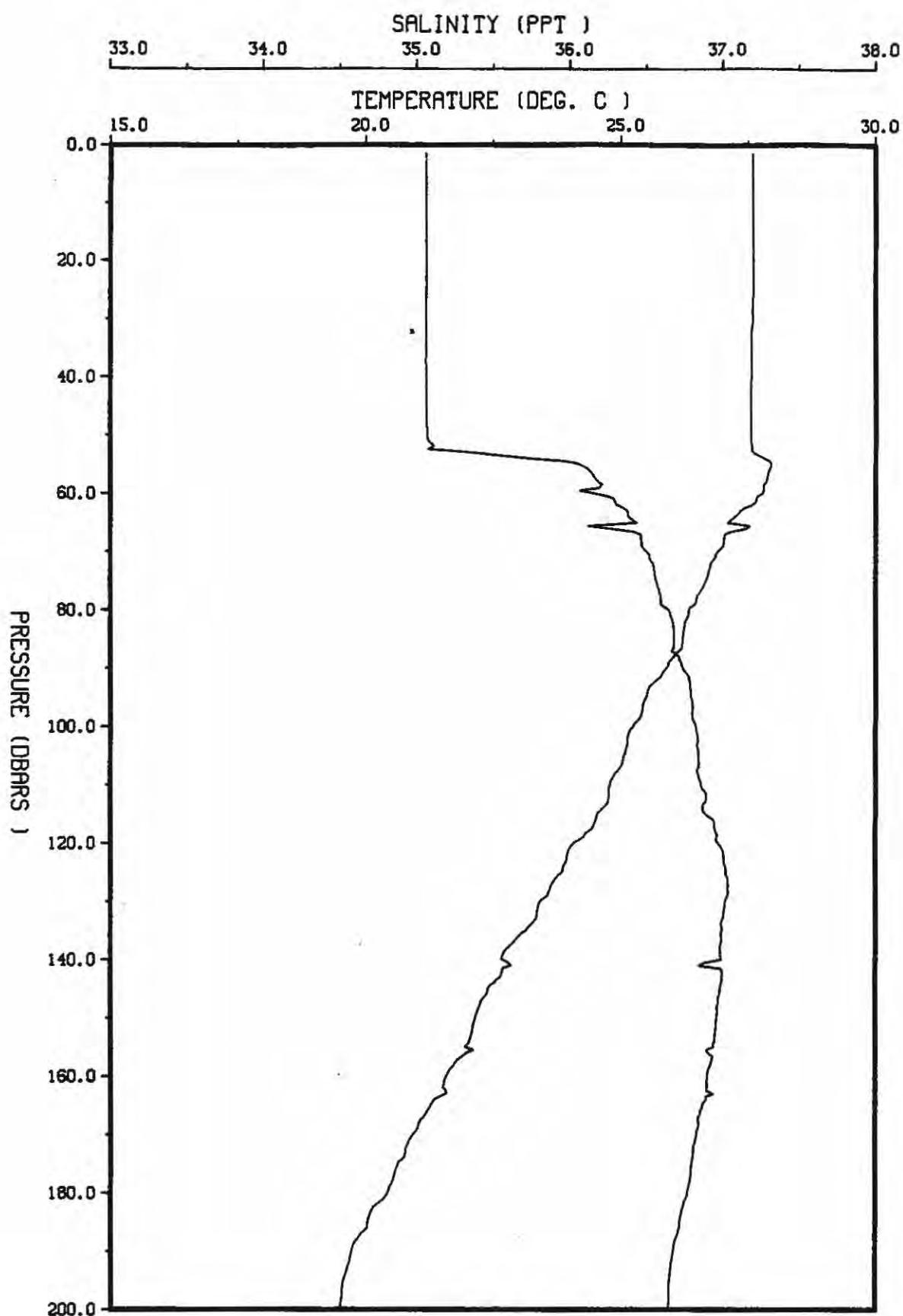
LAT. 14 42.4N, STN 4, CRUISE 84049

LONG. 64 49.4W, STARTING 1:21GMT, DAY 338, 1984

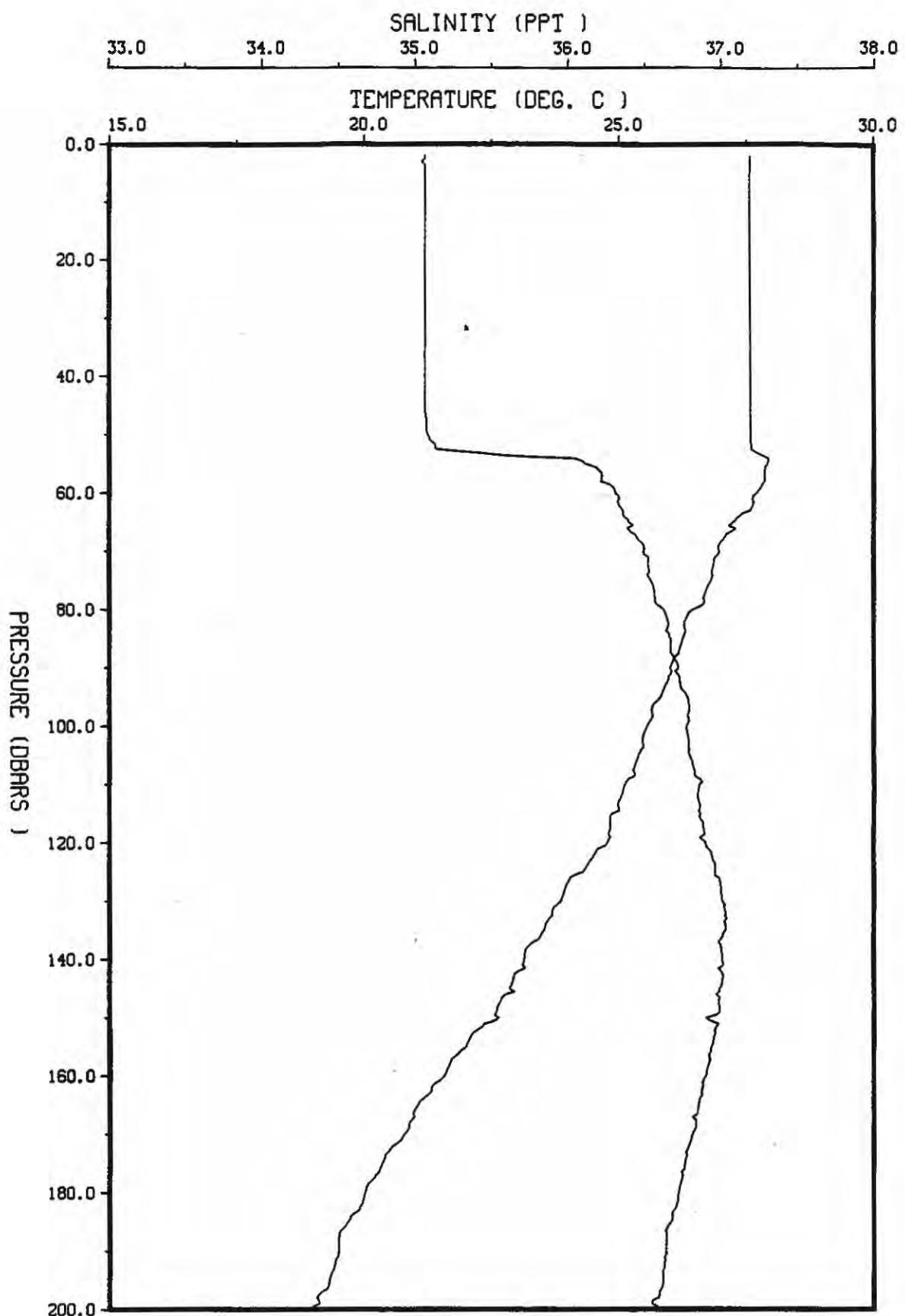


LAT. 14 39.5N, STN 5, CRUISE 84049

LONG. 64 54.0W, STARTING 6:36GMT, DAY 338, 1984

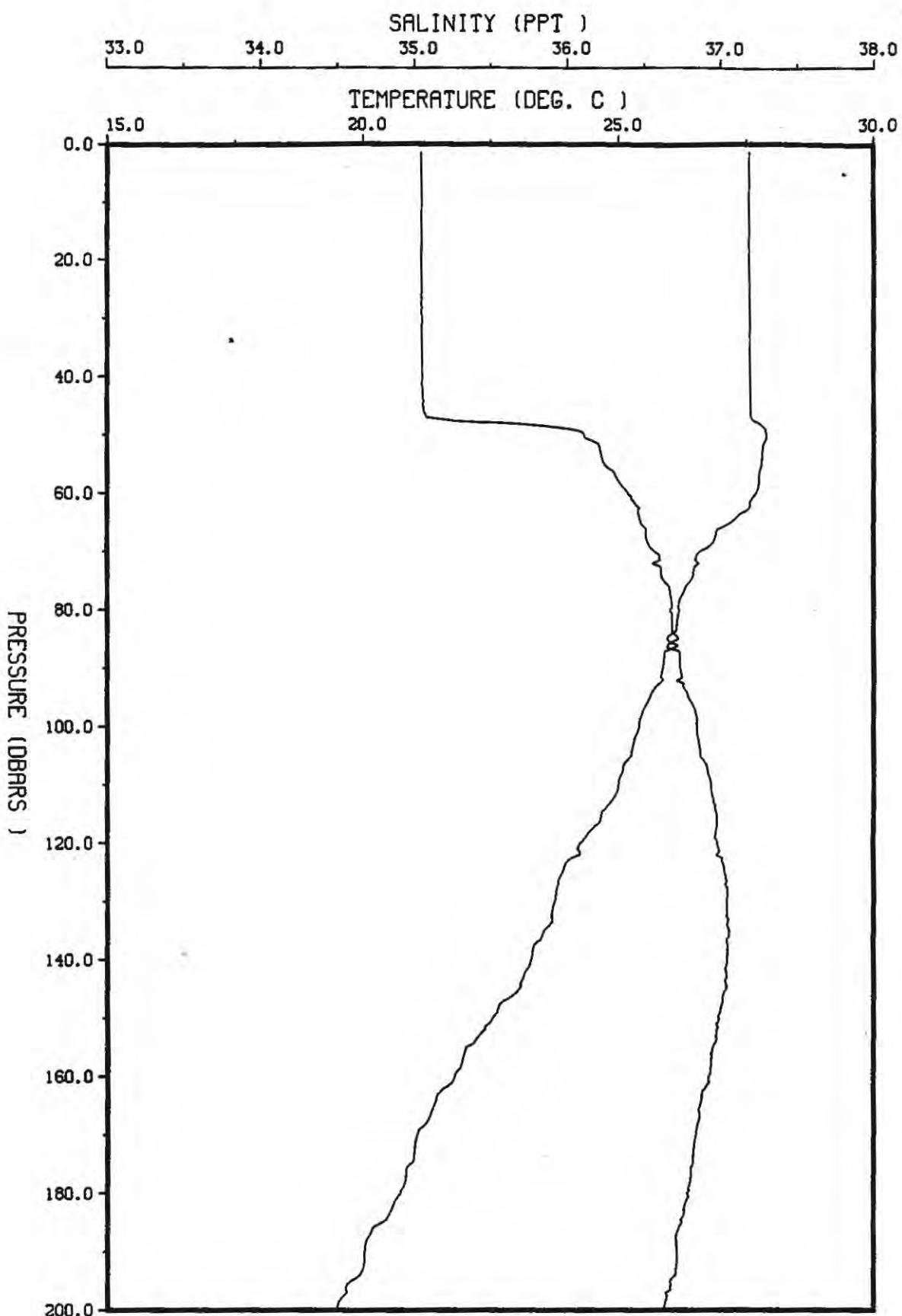


LAT. 14 39.4N, STN 6, CRUISE 84049
LONG. 64 54.9W, STARTING 13:26GMT, DAY 338, 1984

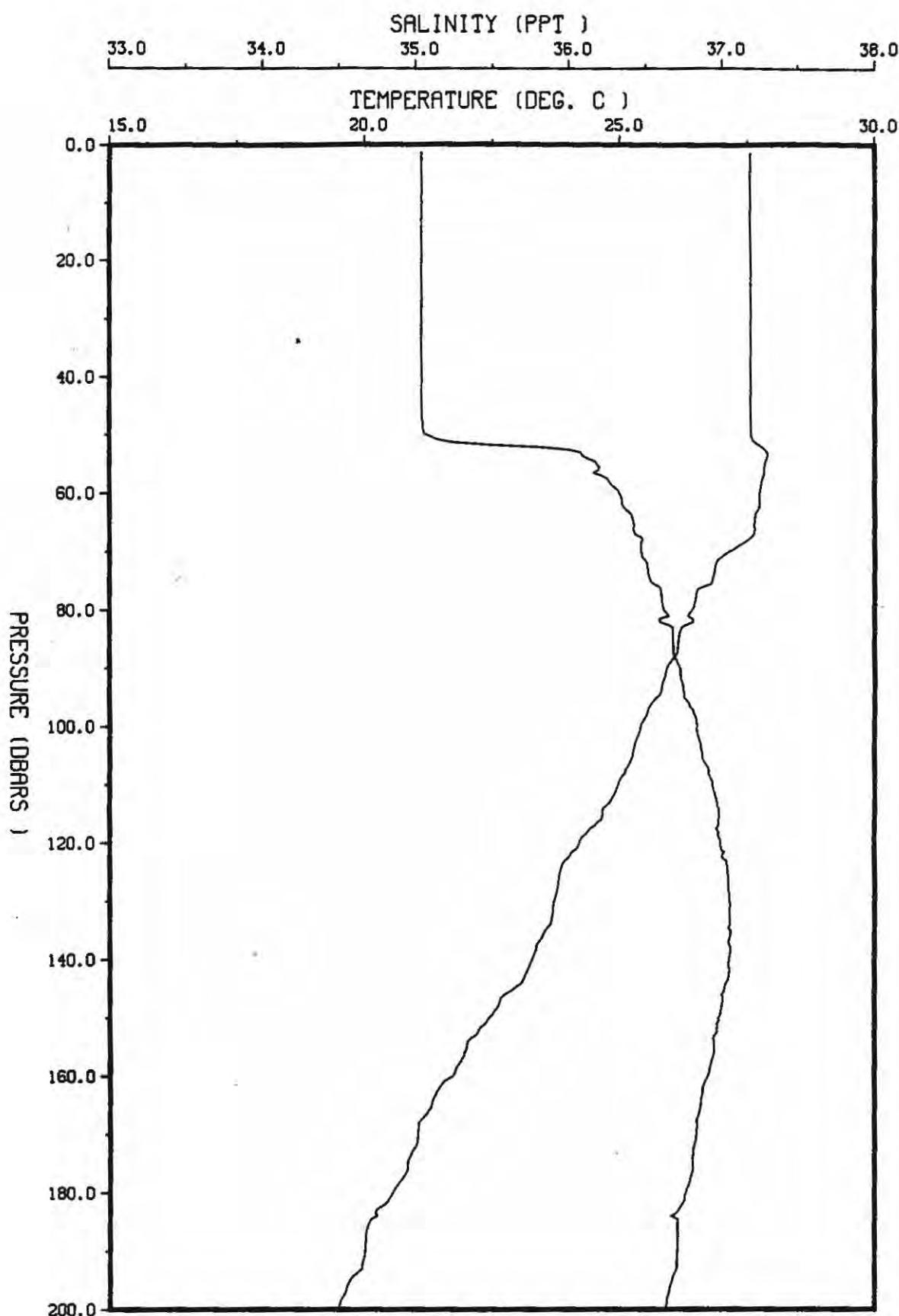


LAT. 14 39.7N, STN 7, CRUISE 84049

LONG. 64 55.6W, STARTING 18:27GMT, DAY 338, 1984

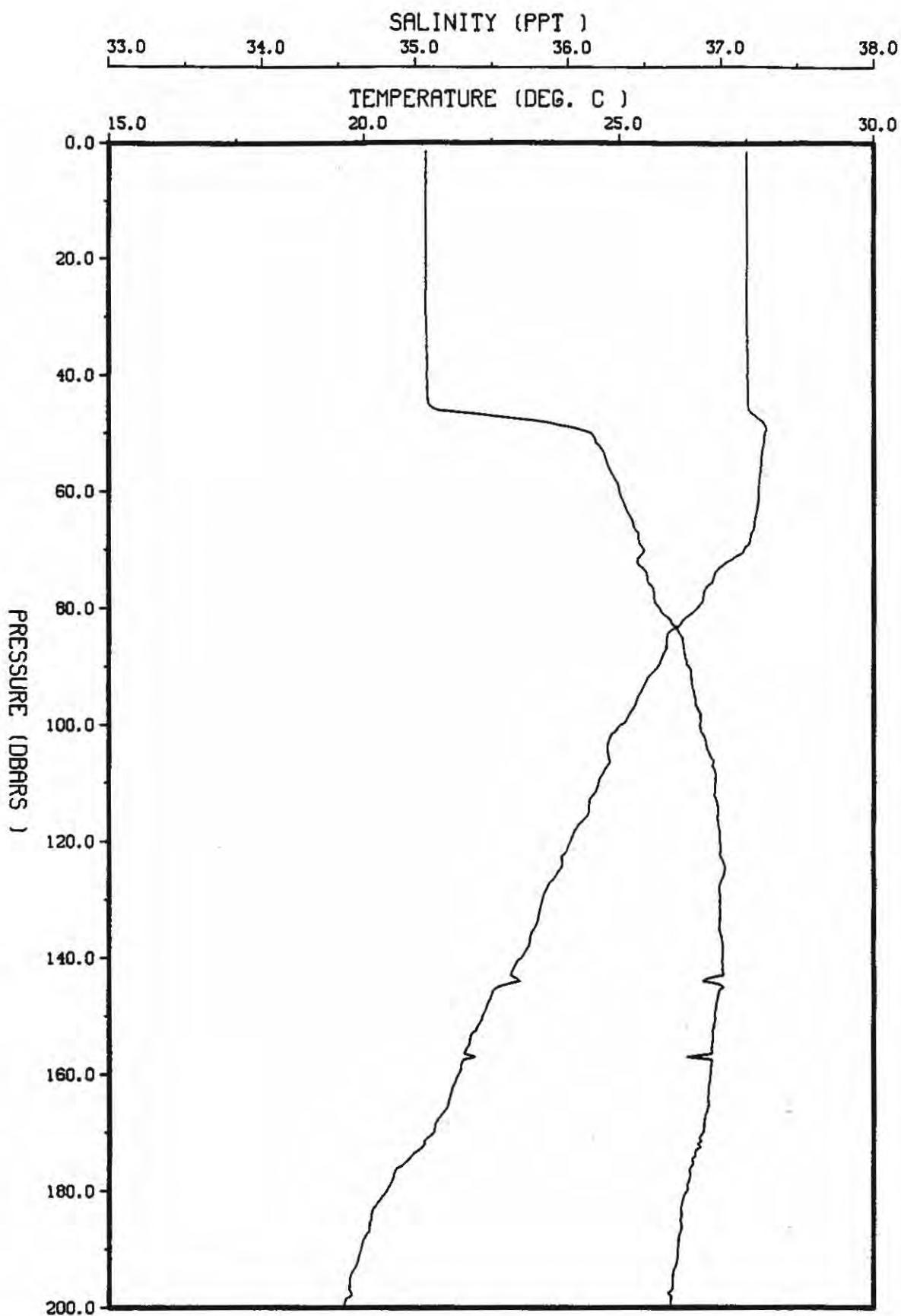


LAT. 14 39.1N, STN 8, CRUISE 84049
LONG. 64 55.6W, STARTING 23:58GMT, DAY 338, 1984



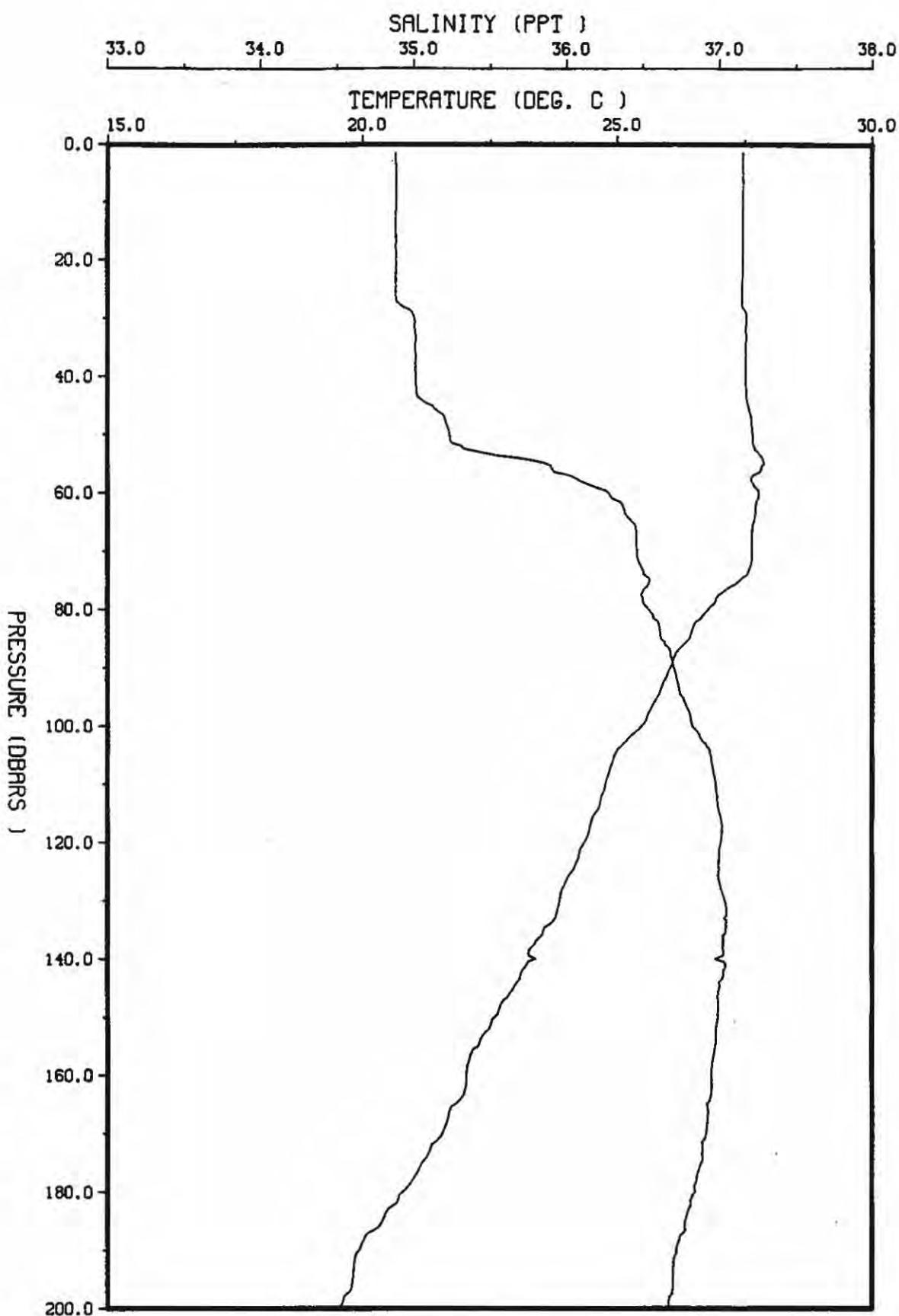
LAT. 14 39.1N, STN 9, CRUISE 84049

LONG. 64 55.6W, STARTING 0:35GMT, DAY 339, 1984

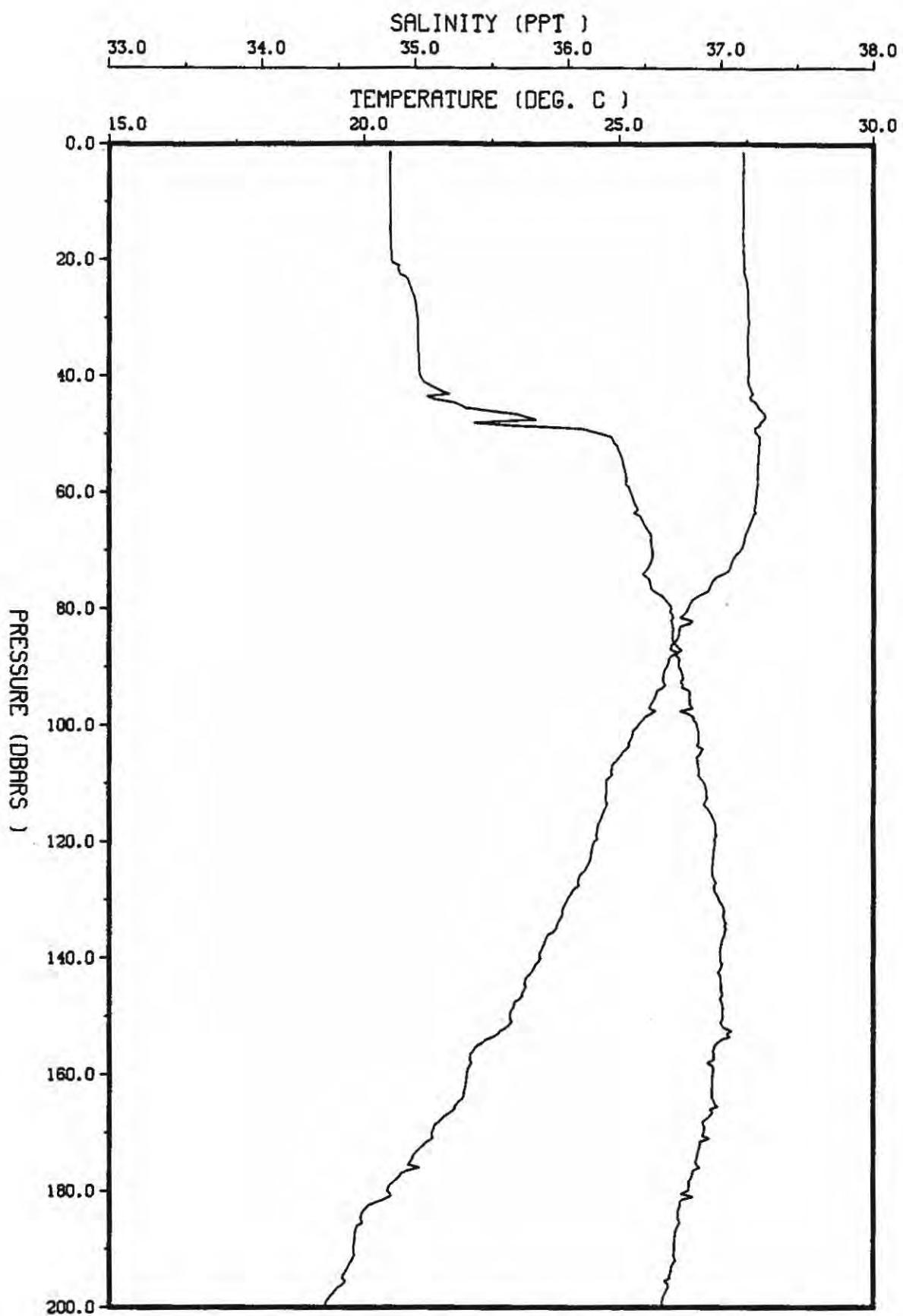


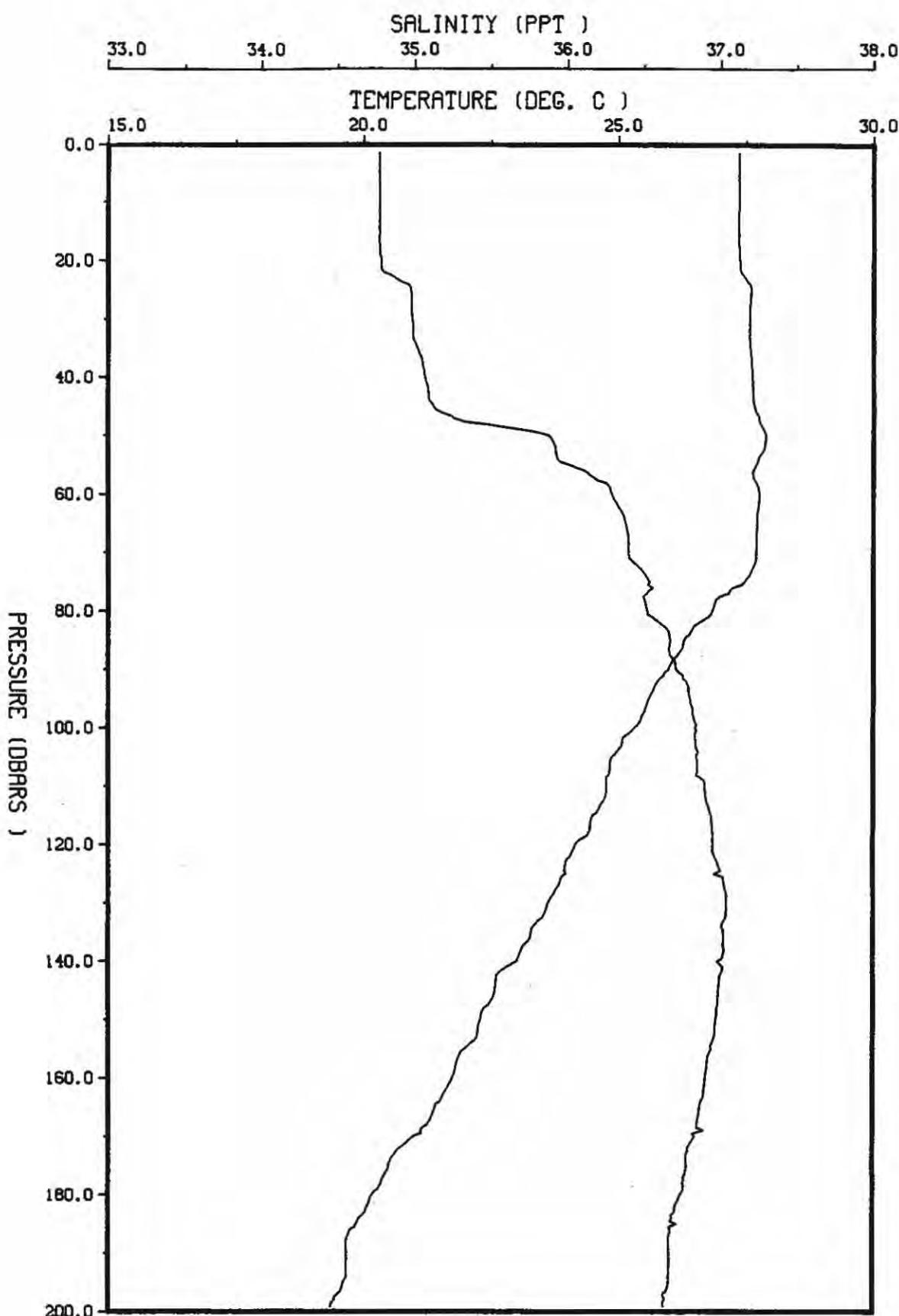
LAT. 14 41.2N, STN 10, CRUISE 84049

LONG. 64 56.5W, STARTING 8:30GMT, DAY 339, 1984

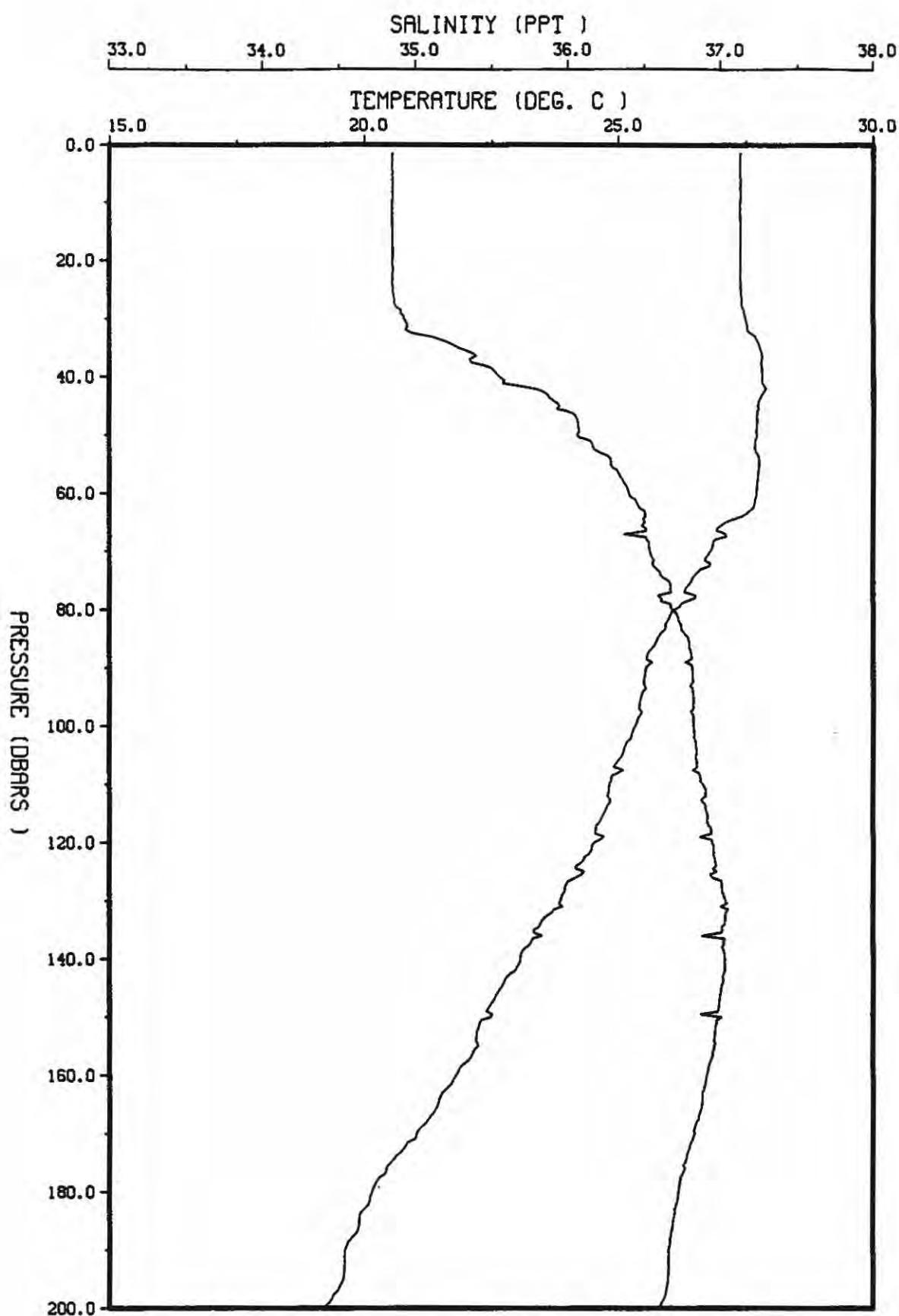


LAT. 14 39.0N, STN 11, CRUISE 84049
LONG. 64 58.3W, STARTING 13: 6GMT, DAY 339, 1984

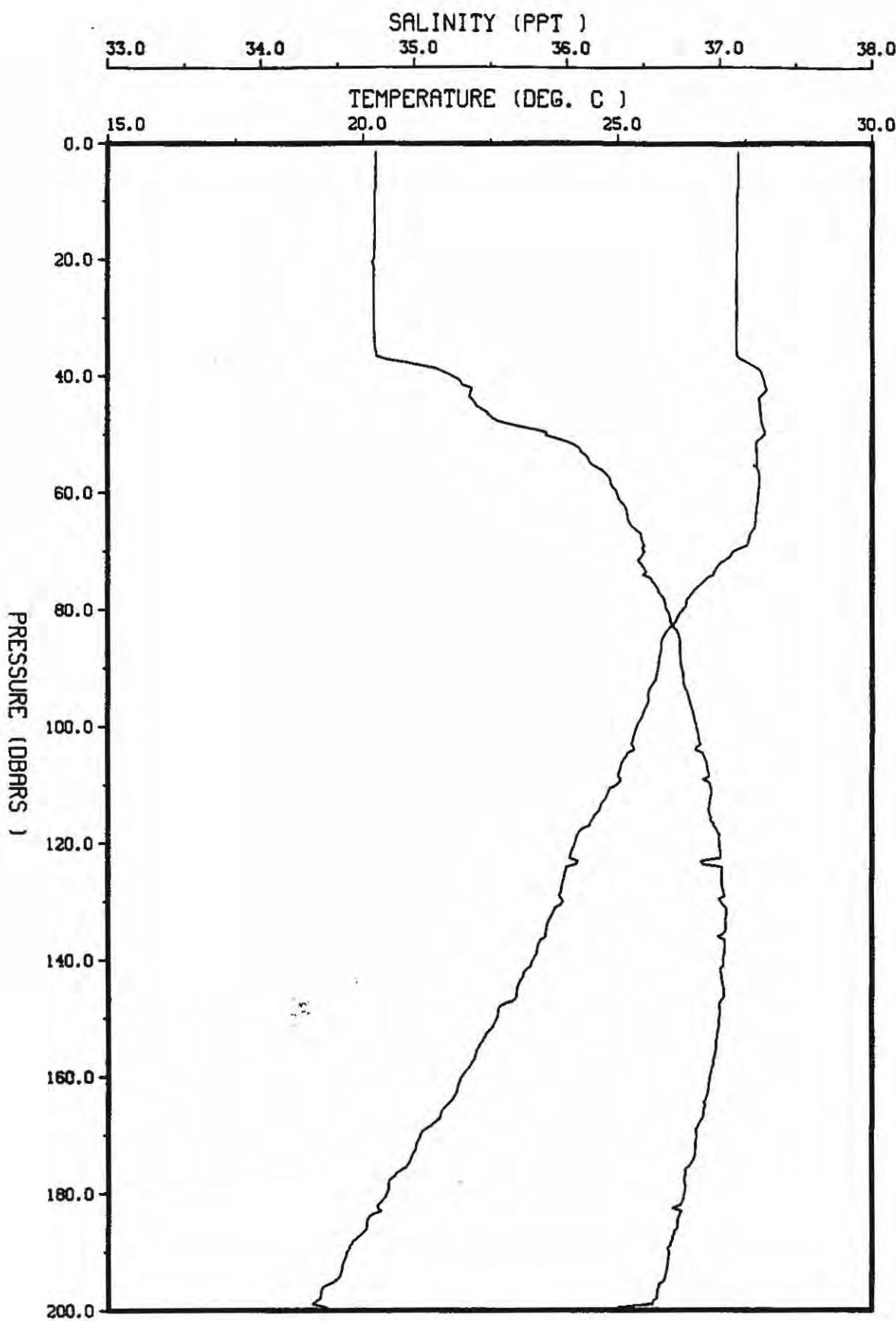




LAT. 14 43.3N, STN 13, CRUISE 84049
LONG. 64 58.9W, STARTING 23:53GMT, DAY 339, 1984

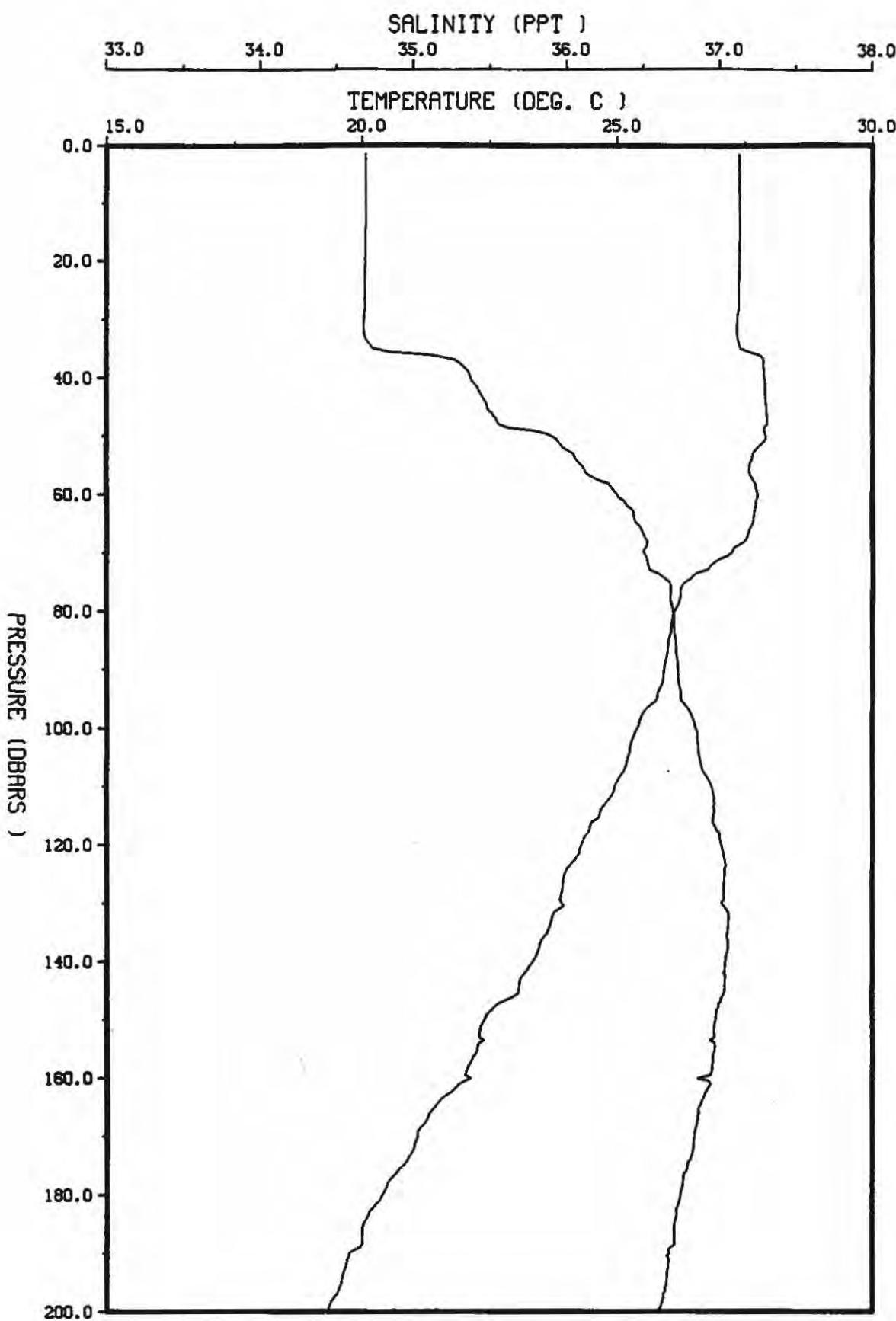


LAT. 14 38.8N, STN 14, CRUISE 84049
LONG. 64 58.9W, STARTING 6:48GMT, DAY 340, 1984

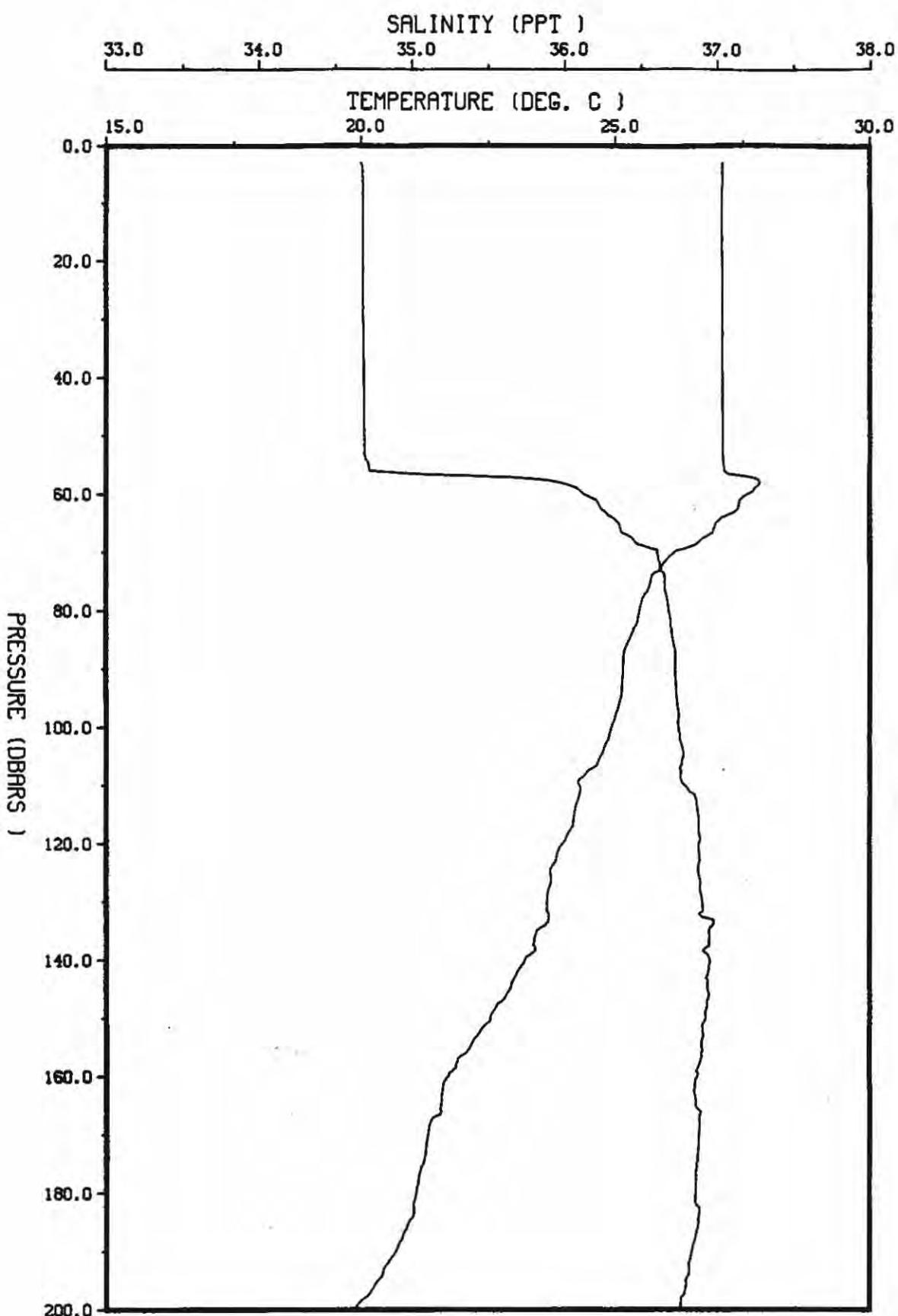


LAT. 14 38.1N, STN 15, CRUISE 84049

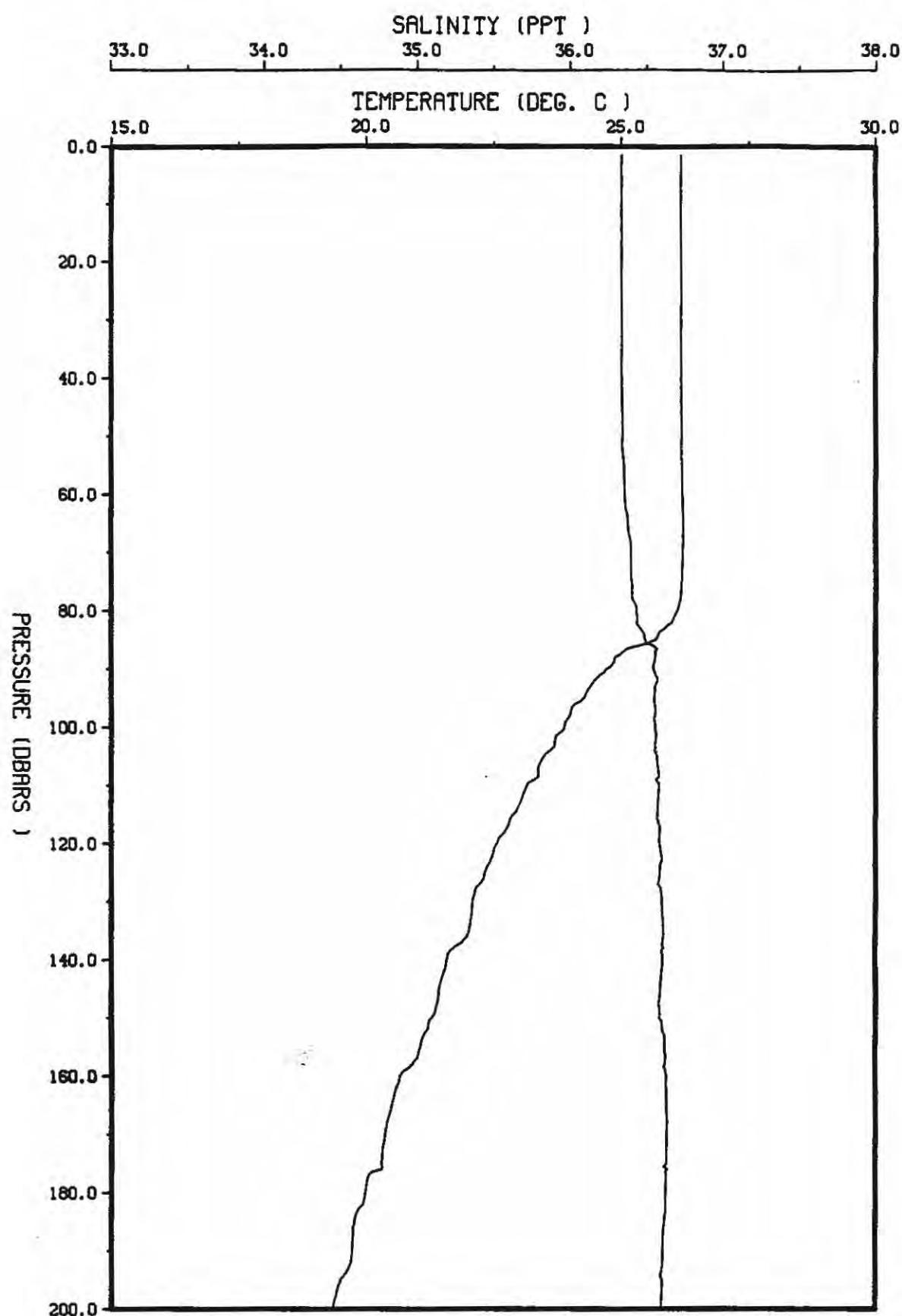
LONG. 64 59.6W, STARTING 13: 3GMT, DAY 340, 1984



LAT. 14 38.3N, STN 16, CRUISE 84049
LONG. 65 .8W, STARTING 14:23GMT, DAY 340, 1984



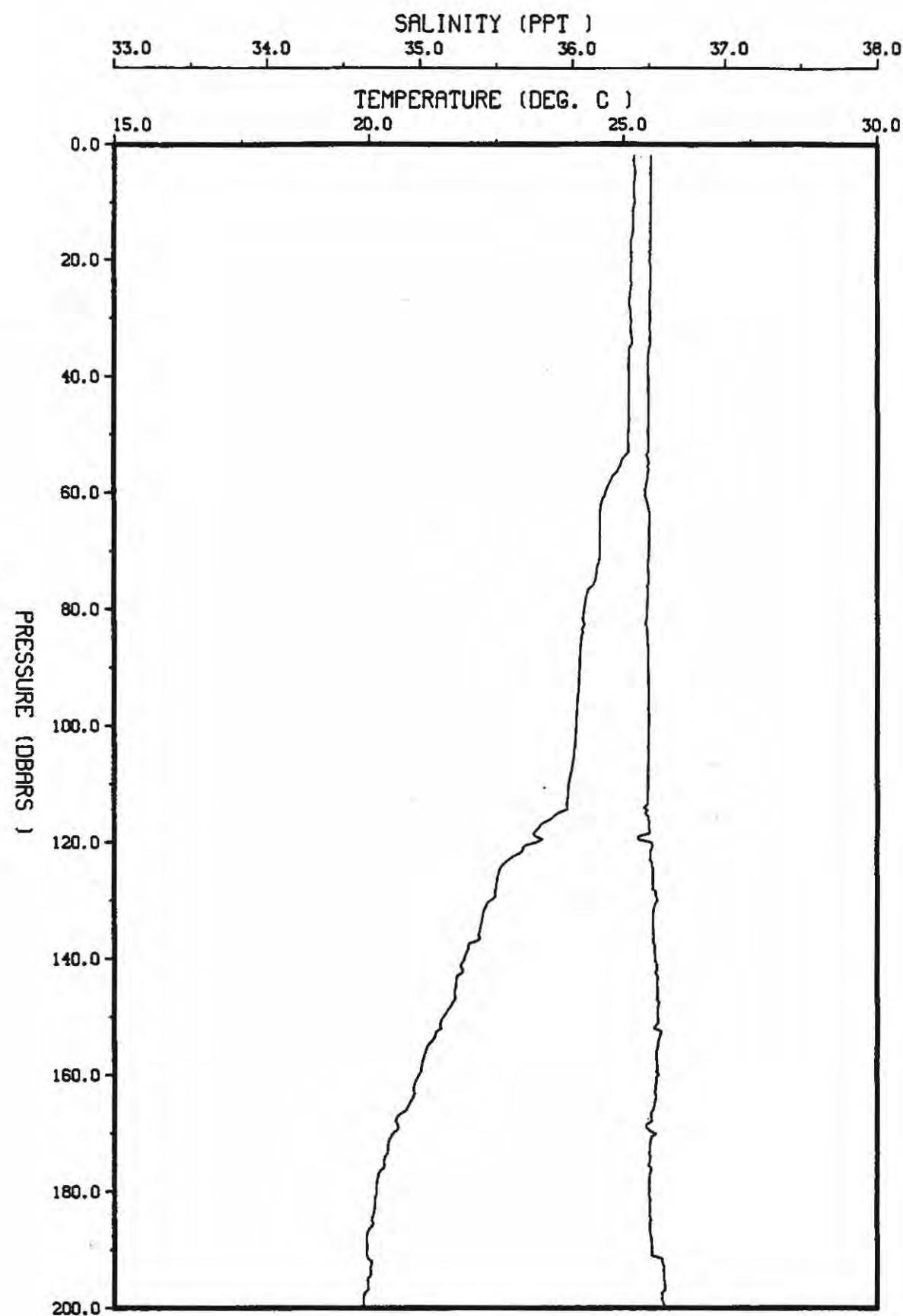
LAT. 16 44.6N, STN 17, CRUISE 84049
LONG. 66 48.6W, STARTING 8:29GMT, DAY 341, 1984



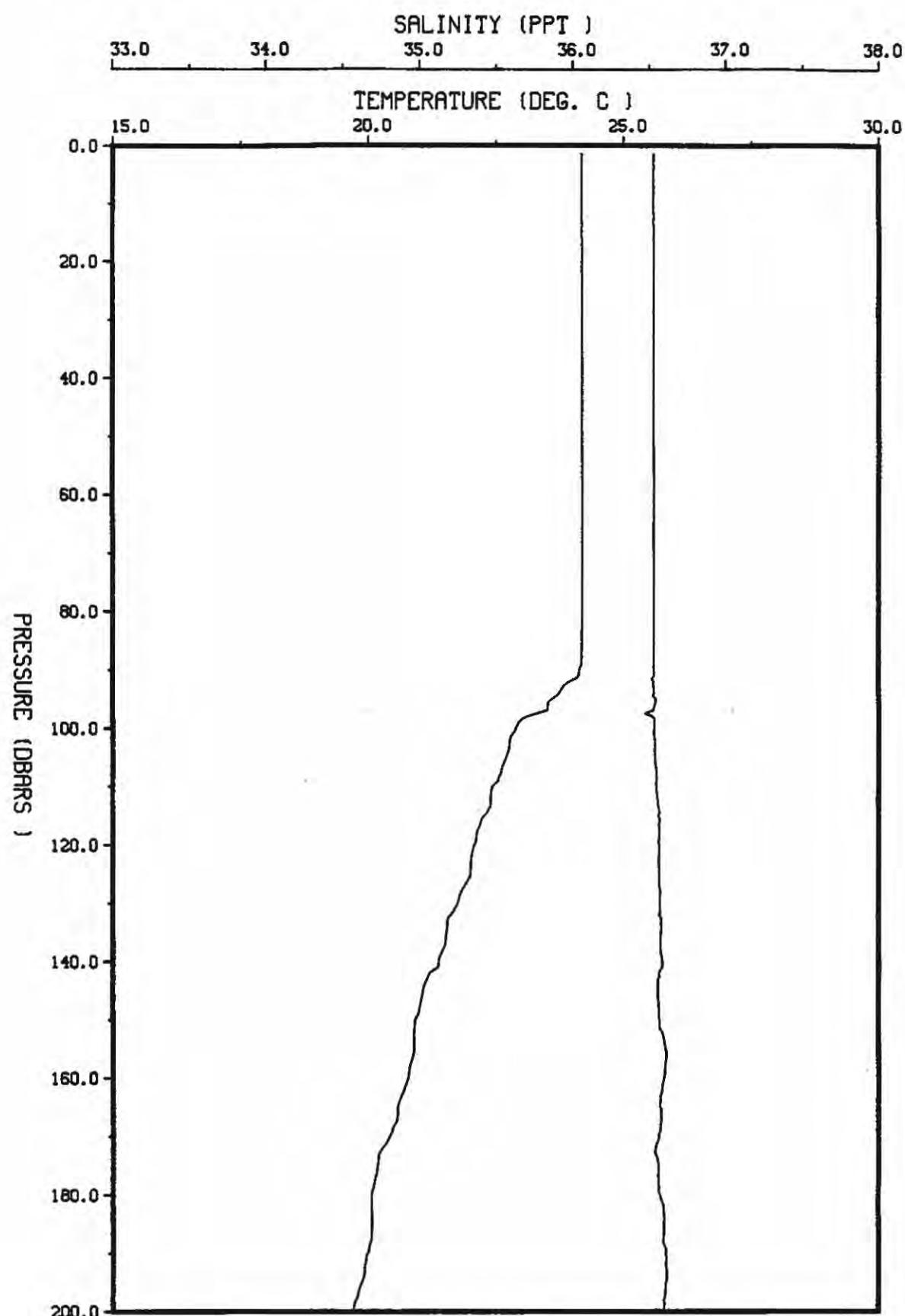
LAT. 20 39.9N, STN 18, CRUISE 84049

LONG. 67 40.4W, STARTING 8:31GMT, DAY 342, 1984

151

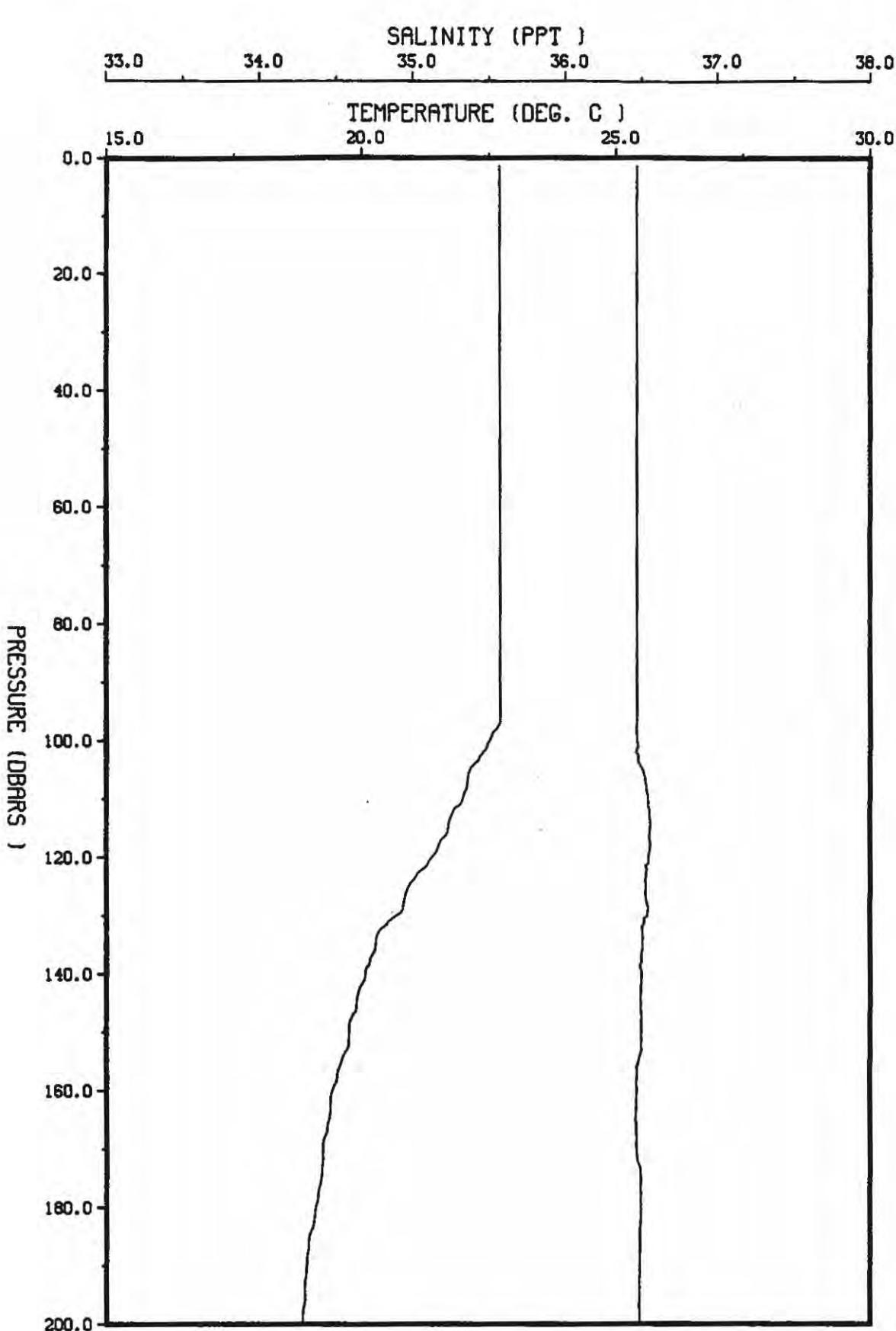


LAT. 23 38.4N, STN 19, CRUISE 84049
LONG. 70 25.5W, STARTING 8:33GMT, DAY 343, 1984



LAT. 26 41.6N, STN 20, CRUISE 84049

LONG. 73 39.0W, STARTING 8:26GMT, DAY 344, 1984



LAT. 29 56.1N, STN 21, CRUISE 84049

LONG. 77 19.0W, STARTING 8:28GMT, DAY 345, 1984

Total Radiation

Totals are W m^{-2} for each hour ending at hour indicated. All times are A.S.T.

TOTAL RADIATION
DECEMBER, 1984

Time	30/11	01/12	02/12	03/12	04/12	05/12	06/12	07/12	08/12	09/12	10/12	11/12	12/12
0600		0	0	0	0	0	0	0	0	0	0	0	0
0700		23	11	9	7	7	6	2	0	0	0	0	0
0800		146	98	92	101	57	51	86	67	6	3	0	0
0900		297	271	243	196	260	281	287	192	33	53	49	20
1000		414	361	418	368	439	470	419	395	56	127	131	107
1100	601	586	581	553	528	556	565	546	547	122	198	119	165
1200	569	624	618	509	592	551	663	630	597	374	245	187	187
1300	651	576	581	650	620	646	633	665	642	83	503	444	249
1400	536	496	485	632	588	561	559	560	597	10	549	494	431
1500	405	357	353	419	487	528	395	502	461	10	466	332	363
1600	269	243	295	240	381	405	275	400	377	21	349	309	211
1700	107	78	199	143	139	156	161	198	208	20	208	193	139
1800	8	6	34	30	28	29	19	40	29	14	53	35	33
1900	0	0	0	0	0	0	0	0	0	0	0	0	0

	13/12	14/12	15/12	16/12
0600	0	0	0	0
0700	0	0	0	0
0800	0	0	0	0
0900	26	23	8	12
1000	78	115	44	55
1100	265	225	130	89
1200	351	297	181	130
1300	422	331	336	144
1400	441	330	378	265
1500	377	261	273	
1600	237	126	219	
1700	99	111	116	
1800	26	33	13	
1900	0	0	0	

Photosynthetically Active Radiation

P.A.R.

Totals are W m⁻² in each hour ending at hour indicated. All times are A.S.T.



PAR
DECEMBER, 1984

Time	30/11	01/12	02/12	03/12	04/12	05/12	06/12	07/12	08/12	09/12	10/12	11/12	12/12
0600		0	0	0	0	0	0	0	0	0	0	0	0
0700		24	14	8	6	6	5	2	0	0	0	0	0
0800		122	77	74	81	47	47	38	43	-	5	0	3
0900		237	212	212	164	214	226	169	152	-	44	37	16
1000		326	284	335	301	347	366	327	309	-	107	112	88
1100	486	459	463	449	430	450	457	430	418	-	164	101	131
1200	462	509	509	413	477	453	542	495	464	-	203	152	152
1300	518	474	493	527	512	515	509	534	505	78	395	339	194
1400	421	415	410	509	493	465	466	475	480	13	432	382	309
1500	315	303	306	361	397	412	338	406	373	13	367	258	272
1600	204	206	254	213	303	314	233	328	301	23	282	243	166
1700	81	95	136	125	123	143	130	167	174	19	169	150	103
1800	7	11	23	27	27	22	19	36	28	13	44	29	29
1900	0	0	0	0	0	0	0	0	0	0	0	0	0

	13/12	14/12	15/12	16/12
0600	0	0	0	0
0700	0	0	0	0
0800	0	0	0	0
0900	21	21	7	11
1000	63	88	38	44
1100	188	172	106	71
1200	254	238	142	102
1300	311	267	254	113
1400	311	263	264	184
1500	264	207	215	
1600	159	103	157	
1700	72	78	75	
1800	21	23	10	
1900	0	0	0	