



Scientific Excellence • Resource Protection & Conservation • Benefits for Canadians
Excellence scientifique • Protection et conservation des ressources • Bénéfices aux Canadiens

Primary Production in the Celtic Sea in May and June 1986



B. Irwin¹, C. Caverhill¹, T. Platt¹, I. Joint² and M. Fasham³

1. Biological Sciences Branch
Department of Fisheries and Oceans
Bedford Institute of Oceanography, P.O. Box 1006
Dartmouth, Nova Scotia, Canada B2Y 4A2
2. Plymouth Marine Laboratory, Prospect Place, West Hoe
Plymouth, PL1 3DH, United Kingdom
3. Institute of Oceanographic Sciences, Brook Road,
Village of Godalming, Wormley, Surrey, England GU8 5UB

December 1988

Canadian Data Report of Fisheries and Aquatic Science No. 718



Fisheries
and Oceans

Pêches
et Océans

Canada

Canadian Data Report of Fisheries and Aquatic Sciences

Data reports provide a medium for filing and archiving data compilations where little or no analysis is included. Such compilations commonly will have been prepared in support of other journal publications or reports. The subject matter of data reports reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Data reports are not intended for general distribution and the contents must not be referred to in other publications without prior written authorization from the issuing establishment. The correct citation appears above the abstract of each report. Data reports are abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Numbers 1-25 in this series were issued as Fisheries and Marine Service Data Records. Numbers 26-160 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Data Reports. The current series name was introduced with the publication of report number 161.

Data reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport statistique canadien des sciences halieutiques et aquatiques

Les rapports statistiques servent à classer et à archiver les compilations de données pour lesquelles il y a peu ou point d'analyse. Ces compilations auront d'ordinaire été préparées à l'appui d'autres publications ou rapports. Les sujets des rapports statistiques reflètent la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports statistiques ne sont pas destinés à une vaste distribution et leur contenu ne doit pas être mentionné dans une publication sans autorisation écrite préalable de l'établissement auteur. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports statistiques sont résumés dans la revue *Résumés des sciences aquatiques et halieutiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros 1 à 25 de cette série ont été publiés à titre de relevés statistiques, Services des pêches et de la mer. Les numéros 26 à 160 ont été publiés à titre de rapports statistiques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 161.

Les rapports statistiques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Data Report of
Fisheries and Aquatic Science No. 718

December 1988

PRIMARY PRODUCTION IN THE CELTIC SEA IN MAY AND JUNE 1986

by

B. Irwin¹, C. Caverhill¹, T. Platt¹, I. Joint² and M. Fasham³

- 1 Biological Sciences Branch, Department of Fisheries and Oceans, Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, Nova Scotia, Canada B2Y 4A2
- 2 Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, United Kingdom
- 3 Institute of Oceanographic Sciences, Brook Road, Village of Godalming, Wormley, Surrey, England GU8 5UB

©Minister of Supply and Services Canada 1988

Cat. No. Fs 97-13/718E ISSN 0706-6465

Correct citation for this publication:

Irwin, B., C. Caverhill, T. Platt, I. Joint, and M. Fasham 1988. Primary production in the Celtic Sea in May and June 1986. Can. Data Rep. Fish. Aquat. Sci. No. 718: iv + 241 p.

Abstract

Irwin, B., C. Caverhill, T. Platt, I. Joint, and M. Fasham 1988. Primary production in the Celtic Sea in May and June 1986. Can. Data. Rep. Fish. Aquat. Sci. No. 718: iv + 241 p.

During the period 18 May to 7 June 1986, primary production and other related measurements were made at a single station in the Celtic Sea. In this report we make available the raw data and some fitted parameters.

Résumé

Irwin, B., C. Caverhill, T. Platt, I. Joint, and M. Fasham 1988. Primary production in the Celtic Sea in May and June 1986. Can. Data. Rep. Fish. Aquat. Sci. No. 718: iv + 241 p.

Pendant la période du 18 Mai au 7 Juin 1986, la production primaire et plusieurs autres variables ont été mesurées à une station située dans la mer Celtic. 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 <i>a</i>	1
Organic Particulates	2
Nutrients	2
Incubation Light	2
Estimation of Photosynthetic Parameters	2
Acknowledgements	2
References	3

INTRODUCTION

This is the fourth in a series of data reports giving the results of primary productivity experiments and related nutrient and chlorophyll measurements at stations in the open ocean which were occupied for several consecutive days. For this experiment a site was chosen in the Celtic Sea at 50°30'N 7°00'W (Fig. 1). The site was occupied from 18 May to 21 May, 23 May to 27 May and 29 May to 7 June, 1986.

SAMPLING

All samples for productivity measurements were collected with 30l Niskin bottles. Samples for detailed chlorophyll and nutrient profiles were collected from a rosette sampler. Sampling depths were chosen from physical and biological features evident from the continuous vertical profiles of temperature, salinity and fluorescence.

METHODS

Productivity

Primary productivity was measured using the ^{14}C method essentially as described by Strickland and Parsons (1972). For light saturation experiments 20 μci of sodium bicarbonate ^{14}C was added to 100 mls of sample. A total of 42 light 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 L 7391]. Samples were incubated for from 3 to 4 hours. Whole samples were filtered onto Whatman GF/F glass fibre filters. Larger fractions were collected directly on Nuclepore filters and the smaller fractions were collected on Whatman GF/F filters after first passing through a Nuclepore filter.

Chlorophyll *a*

Replicate 100 ml samples were filtered onto 25 mm Whatman GF/F glass fibre filters or 25 mm Nuclepore 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 for later analysis in methods described in Irwin et al. (1982).

Nutrients

Samples for nitrate, silicate and inorganic phosphate were collected from all sampled depths. Vials were stored frozen at -20°C and later analysed in the laboratory using standard colourometric techniques.

Incubation Light

Photosynthetically Active Radiation (P.A.R.) was measured at each bottle position in the incubators with a Biospherical Instruments 4π quantum meter (Model Q.S.L. 100).

Estimation of Photosynthetic Parameters

Measurements of specific production P_B 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 $^{-1}$ h $^{-1}$) 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 characterizes 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

We wish to thank Alastair Macdonald and Bala Durvasula for their assistance in the preparation of this report.

REFERENCES

- Holm-Hansen, O., C.J. Lorenzen, R.W. Holmes and J.D.H. Strickland. 1965. Fluorometric determination of chlorophyll. *J. Cons. Int. Explor. Mer.* 30: 3-15.
- Irwin, B., T. Platt, W.G. Harrison, C.L. Gallegos and P. Lindley. 1982. Phytoplankton productivity experiments and nutrient measurements in Ungava Bay, NWT from August 1 to September 3, 1979. *Can. Data Rept. Fish. Aquat. Sci.* No. 287: 208 p.
- Irwin, B., W.G. Harrison, C.L. Gallegos and T. Platt. 1980. Phytoplankton productivity experiments and nutrient measurements in the Labrador Sea, Davis Strait, Baffin Bay and Lancaster Sound from 26 August to 14 September, 1978. *Can. Data Rept. Fish. Aquat. Sci.* No. 213: 103 p.
- Platt, T., C.L. Gallegos and W.G. Harrison. 1981. Photoinhibition of photosynthesis in natural assemblages of marine phytoplankton. *J. Mar. Res.* 38(4): 687-701.
- Strickland, J.D.H. and T. Parsons. 1972. A practical handbook of sea water analysis. *Bull. Fish. Res. Bd. Canada* No. 167: 311 p.
- Yentsch, C.S. and D.W. Menzel. 1963. A method for the determination of phytoplankton chlorophyll and phaeophytin by fluorescence. *Deep Sea Res.* 10: 221-231.



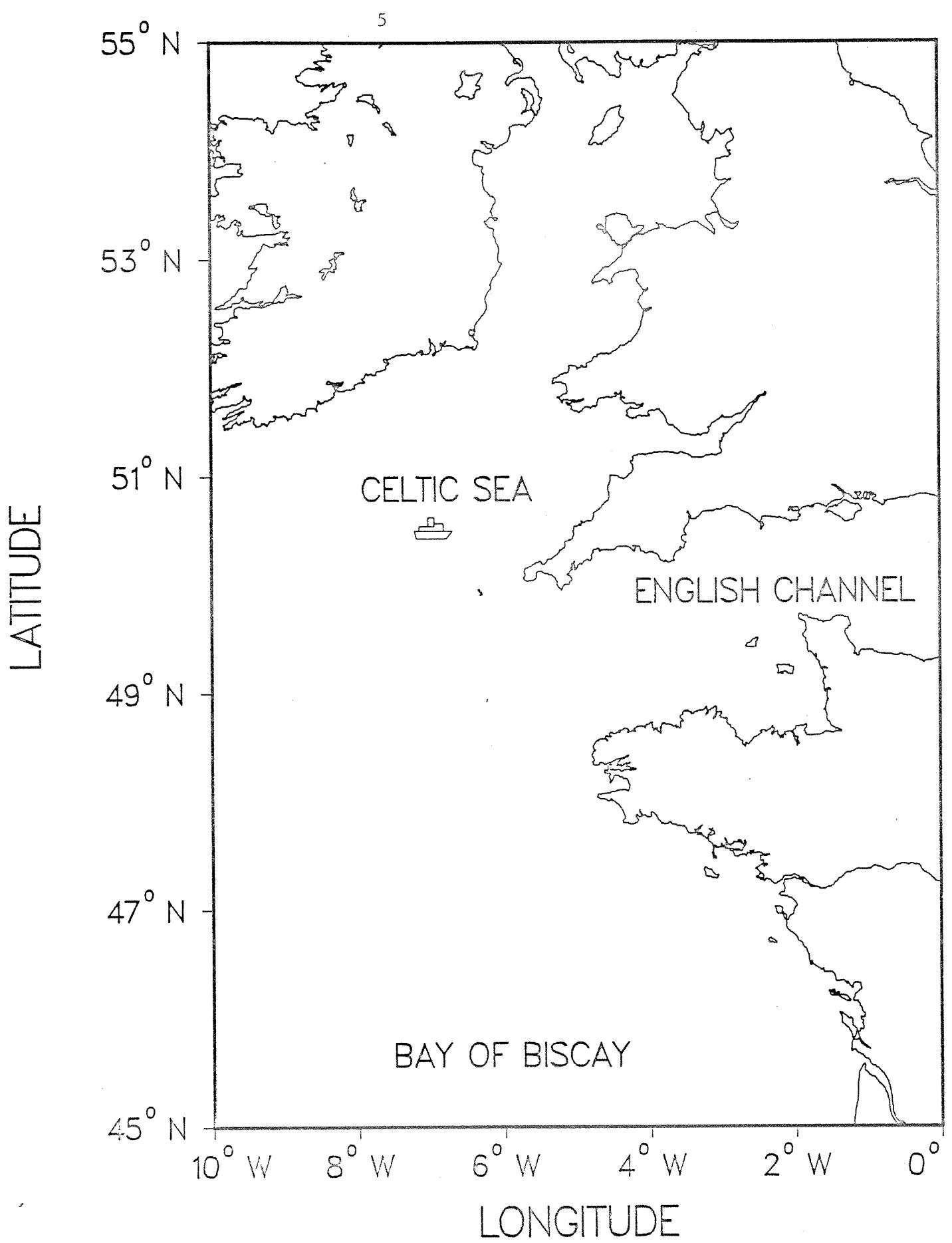
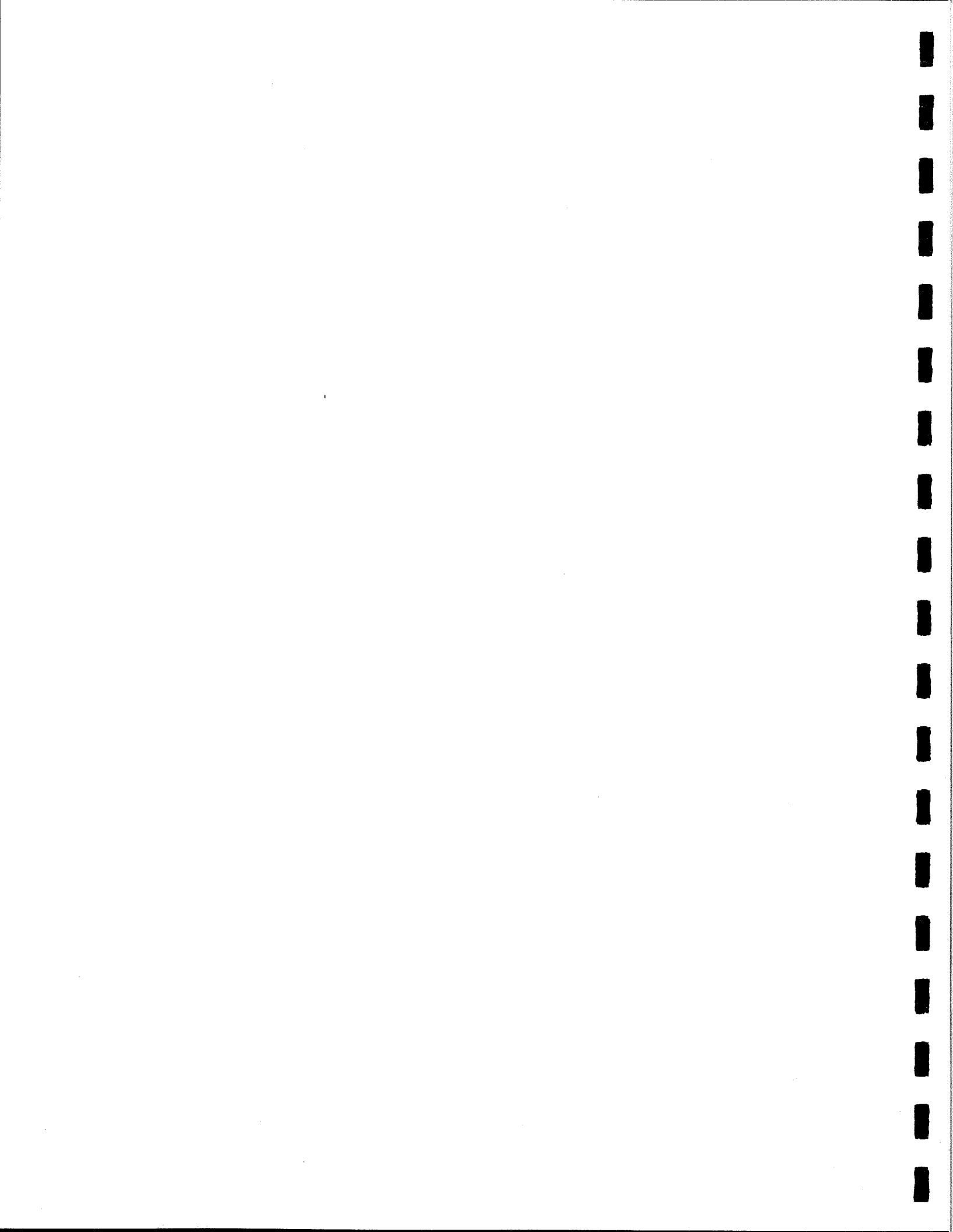


Fig. 1 Celtic Sea 1986 Station Position.



LIGHT SATURATION DATA AND RELATED BIOMASS AND NUTRIENT DATA



Units

P = mg C (mg Chl⁻¹) m⁻³ h⁻¹

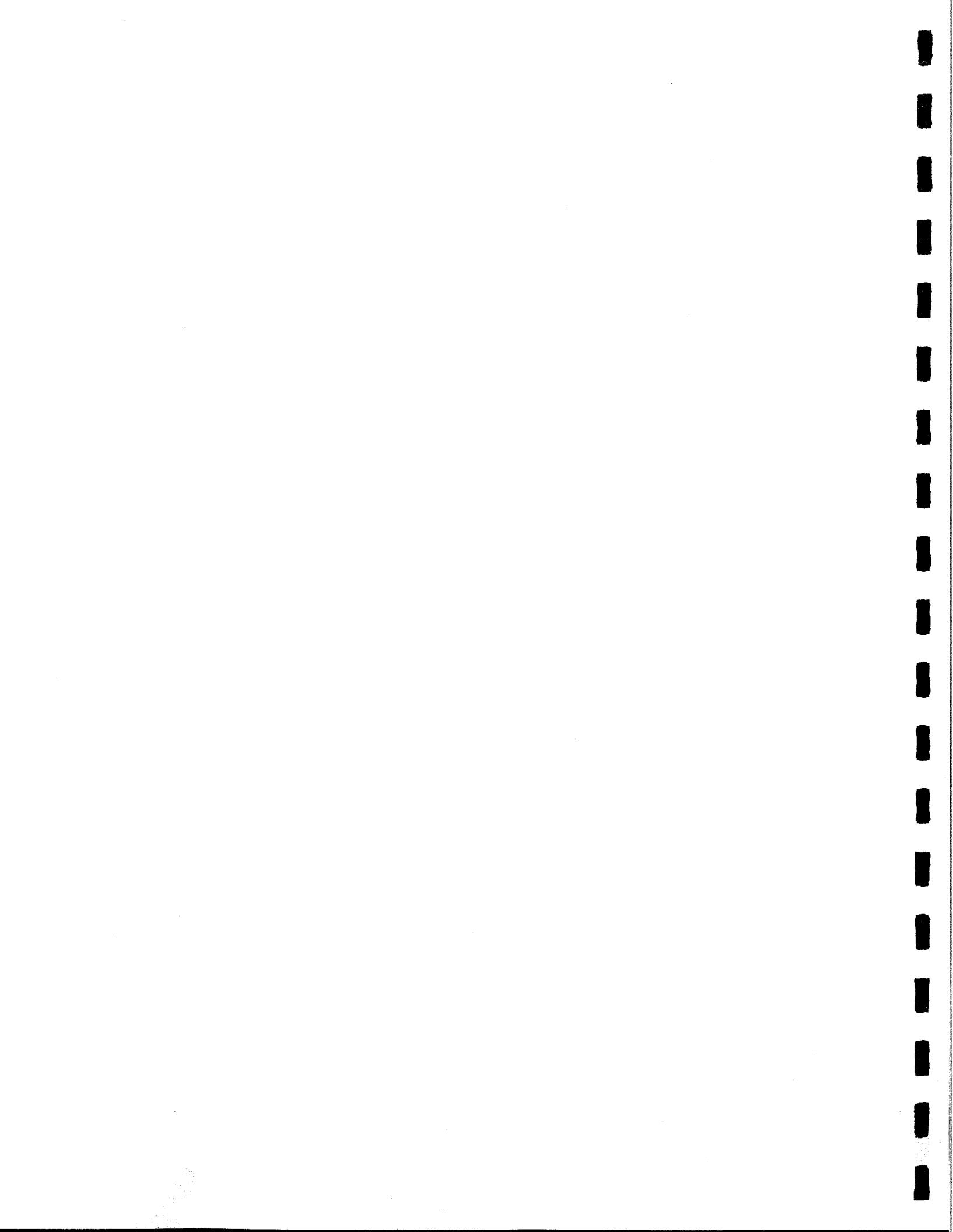
I = W m⁻²

P_S = mg C (mg Chl)⁻¹ h⁻¹

α = 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, α , β are shown in the closed brackets below the estimates for each parameter.



CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 18/05/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
885	2.21	658	2.87	542	3.51	458	3.17
447	3.31	359	3.53	219	3.84	203	3.29
155	3.54	124	3.39	112	3.35	98	2.90
72	2.41	64	2.74	55	2.79	48	2.13
42	2.00	35	1.73	30	2.00	24	1.54
22	1.58	19	1.22	17	1.11	14	.73
10	.73	8	.57	7	.52	7	.38
6	.31	5	.26	4	.21	3	.12
3	.13	3	.10	2	.08	2	.07
1	.05	1	.04	1	.01	.5	.02
.4	.01	.4	.01				

PARAMETER VALUES

PS : 4.17	ALPHA : .071	BETA : .0024
(3.99, 4.36)	(.068, .074)	(.0018, .0029)

FRACTION : WHOLE

SAMPLE TEMP 9.8°C INCUBATION TEMP 9.8°C

CHLOROPHYLL : 3.09 NITRATE : 3.13

CARBON : 281 NITROGEN : 41

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 18/05/1986

DEPTH 10 M

I	P	I	P	I	P	I	P
538	2.57	478	3.16	419	3.49	367	3.02
323	3.29	247	3.52	175	4.08	144	3.43
124	3.58	98	3.13	94	2.72	76	3.21
69	2.89	58	3.16	53	2.65	51	2.12
45	2.07	27	1.49	19	1.08	17	.99
14	.90	13	.72	11	.62	54	.32
5	.47	4	.27	4	.28	4	.23
3	.17	3	.16	3	.16	3	.13
3	.12	3	.12	3	.11	3	.07
2	.04	1	.05	.4	.01	.3	.01
2	.00						

PARAMETER VALUES

PS :	4.72	ALPHA :	.070	BETA :	.0046
(	4.32, 5.11 )	(	.066, .074 )	(	.0032, .0060)

FRACTION : > 1 MICRON

SAMPLE TEMP	9.8°C	INCUBATION TEMP	9.8°C
-------------	-------	-----------------	-------

CHLOROPHYLL :	2.03	NITRATE :	3.13
---------------	------	-----------	------

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 18/05/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
538	1.16	478	1.18	419	1.24	323	1.02
247	1.26	175	1.28	124	1.13	98	1.33
94	1.32	76	1.20	69	1.12	53	1.30
51	1.08	45	1.19	27	.81	19	.67
17	.76	14	.60	13	.53	11	.33
5	.26	5	.22	4	.20	4	.18
4	.16	3	.12	3	.10	3	.14
3	.06	3	.08	3	.08	2	.04
2	.03	1	.00				

13

PARAMETER VALUES

PS :	1.33	ALPHA :	.051	BETA :	.0004
(	1.27, 1.38 )	(	.048, .055 )	(	.0002, .0006)

FRACTION : < 1 MICRON

SAMPLE TEMP : 9.8°C INCUBATION TEMP : 9.8°C

CHLOROPHYLL : .95 NITRATE : 3.13

CARBON : 103 NITROGEN : 13

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 19/05/1986 DEPTH 30 M

I	P	I	P	I	P	I	P
610	.10	439	.23	399	.42	359	.63
311	.98	275	1.50	183	1.53	148	1.98
140	1.95	98	1.97	65	1.85	52	1.52
45	1.91	40	1.79	36	1.56	32	1.34
22	1.43	20	1.30	18	1.09	17	.96
15	.91	13	.75	8	.70	7	.47
6	.36	5	.28	5	.27	4	.25
3	.21	2	.16	2	.13	2	.09
2	.09	2	.05	1	.06	1	.05
.8	.03	.5	.03	.4	.02	.3	.02

PARAMETER VALUES

PS : 4.21	ALPHA : .071	BETA : .0210
(3.56, 4.86)	(.067, .074)	(.0152, .0267)

FRACTION : WHOLE

SAMPLE TEMP 9.8°C INCUBATION TEMP 4.8°C

CHLOROPHYLL : 2.35 NITRATE : 3.49

CARBON : 195 NITROGEN : 28

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 19/05/1986 DEPTH 30 M

I	P	I	P	I	P	I	P
690	.44	542	1.10	470	1.45	419	1.87
359	2.20	183	2.06	159	2.15	136	2.26
112	2.00	98	1.98	86	1.75	60	1.86
49	1.79	43	1.91	42	1.50	39	1.37
37	1.15	25	1.15	20	.95	18	.79
16	.77	15	.57	13	.44	7	.38
6	.33	6	.25	6	.23	5	.20
3	.13	3	.11	2	.09	2	.09
2	.09	2	.08	1	.04	.9	.03
.8	.02	.5	.01	.4	.01	.4	.01

PARAMETER VALUES

PS : 3.22 ALPHA : .051 BETA : .0057
 (2.88, 3.56) (.048, .055) (.0042, .0072)

FRACTION : > 1 MICRON

SAMPLE TEMP 9.8°C INCUBATION TEMP 9.7°C

CHLOROPHYLL : 2.02 NITRATE : 3.49

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 19/05/1986 DEPTH 30 M

I	P	I	P	I	P	I	P
690	.43	542	.83	470	1.19	419	1.16
359	1.10	311	1.70	183	1.53	136	1.67
98	1.68	86	1.37	60	1.49	49	1.26
43	1.06	42	1.60	39	1.23	37	1.45
25	1.23	20	1.12	18	.94	16	.95
15	.70	13	.50	8	.51	7	.52
6	.34	6	.42	6	.23	5	.24
3	.19	3	.15	2	.15	2	.14
2	.09	2	.09	1	.06	.9	.04
.8	.03	.5	.01	.4	.01	.4	.03

PARAMETER VALUES

PS : 1.93 ALPHA : .066 BETA : .0026
(1.80, 2.07) (.061, .071) (.0020, .0032)

FRACTION : < 1 MICRON

SAMPLE TEMP 9.8°C INCUBATION TEMP 9.7°C

CHLOROPHYLL : .48 NITRATE : 3.49

CARBON : 72 NITROGEN : 10

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 20/05/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
610	1.31	439	1.45	399	1.91	359	1.99
311	2.22	275	2.08	183	2.29	148	2.24
140	2.13	120	2.09	112	1.98	98	2.23
65	1.98	52	2.11	45	1.76	40	1.50
36	1.58	32	1.37	20	1.00	18	.89
17	.79	15	.56	13	.58	8	.46
7	.33	6	.28	5	.20	5	.17
4	.16	3	.12	2	.08	2	.07
2	.06	2	.05	2	.04	1	.03
1	.02	.8	.02	.5	.01	.4	.01
.3	.00						

PARAMETER VALUES

PS :	2.79	ALPHA :	.060	BETA :	.0031
(	2.64, 2.93 )	(	.057, .063 )	(	.0025, .0037)

FRACTION : WHOLE

SAMPLE TEMP 10.0°C INCUBATION TEMP 10.0°C

CHLOROPHYLL : 3.77 NITRATE : .11

CARBON : 261 NITROGEN : 37

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 20/05/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
690	1.43	542	1.61	470	2.05	419	2.12
359	2.29	183	1.95	159	2.19	136	2.26
86	2.19	60	2.00	49	1.98	43	1.85
42	1.63	39	1.24	37	.92	25	.97
20	.83	18	.65	16	.76	15	.58
13	.44	8	.42	7	.31	6	.22
6	.18	6	.13	5	.12	3	.09
3	.08	2	.05	2	.05	2	.05
2	.05	1	.02	.9	.01	.8	.01
.5	.01	.4	.01	.4	.00		

8T

PARAMETER VALUES

PS :	2.80	ALPHA :	.052	BETA :	.0024
(	2.57, 3.03 )	(	.049, .056 )	(	.0016, .0031)

FRACTION : > 1 MICRON

SAMPLE TEMP 10.0°C INCUBATION TEMP 10.0°C

CHLOROPHYLL : 2.66 NITRATE : .11

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 20/05/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
690	1.22	542	1.19	470	1.56	419	1.27
359	1.24	183	1.31	136	1.52	112	1.63
98	1.53	86	1.30	60	1.46	49	1.05
42	1.25	39	1.16	37	1.30	25	1.02
20	.83	18	.74	16	.62	15	.54
13	.37	8	.25	7	.35	6	.28
6	.20	5	.16	3	.12	3	.09
2	.08	2	.05	2	.03	2	.04
1	.03	.9	.04	.8	.01	.5	.00

19

PARAMETER VALUES

PS : 1.60	ALPHA : .053	BETA : .0007
(1.52, 1.68)	(.049, .056)	(.0004, .0009)

FRACTION : < 1 MICRON

SAMPLE TEMP 10.0°C INCUBATION TEMP 10.0°C

CHLOROPHYLL : .86 NITRATE : .11

CARBON : 73 NITROGEN : 10

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 20/05/1986

DEPTH 20 M

I	P	I	P	I	P	I	P
610	.15	439	.24	399	.56	359	1.06
311	1.71	275	1.75	183	2.06	148	2.25
140	2.04	120	2.05	112	1.95	98	1.95
65	1.71	52	1.63	45	1.58	40	1.46
36	1.44	32	1.27	22	1.10	20	1.25
18	.95	17	.85	15	.74	13	.66
8	.53	7	.40	6	.36	5	.30
5	.28	4	.21	3	.14	2	.13
2	.11	2	.09	2	.08	2	.08
1	.05	1	.03	.8	.02	.5	.01
.4	.00	.3	.00				

PARAMETER VALUES

PS :	6.62	ALPHA :	.052	BETA :	.0341
(	3.86, 9.38 )	(	.049, .056 )	(	.0130, .0553)

FRACTION : WHOLE

SAMPLE TEMP 9.9°C INCUBATION TEMP 9.9°C

CHLOROPHYLL : 3.86 NITRATE : .49

CARBON : 250 NITROGEN : 37

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 20/05/1986 DEPTH 20 M

I	P	I	P	I	P	I	P
690	.20	542	.53	470	1.11	419	1.13
359	1.94	311	2.22	183	2.10	159	2.15
136	2.12	112	2.18	98	1.80	86	1.93
60	1.68	49	1.79	43	1.91	42	1.57
39	1.54	37	1.24	25	1.44	20	1.23
18	.74	16	.79	15	.61	13	.54
8	.55	7	.38	6	.34	6	.26
6	.24	5	.20	3	.13	3	.12
2	.09	2	.06	2	.07	2	.05
1	.04	.9	.02	.8	.02	.5	.01
.4	.00	.4	.00				

PARAMETER VALUES

PS :	3.79	ALPHA :	.054	BETA :	.0102
(	3.21, 4.36 )	(	.050, .058 )	(	.0070, .0133)

FRACTION : >1 MICRON

SAMPLE TEMP 9.9°C INCUBATION TEMP 9.9°C

CHLOROPHYLL : 2.75 NITRATE : .49

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 20/05/1986 DEPTH 20 M

I	P	I	P	I	P	I	P
690	.10	542	.16	470	.52	419	.34
359	.38	183	.74	159	.87	98	.99
86	.89	60	1.01	49	.92	39	.63
37	.78	25	.58	20	.57	18	.59
16	.51	15	.54	13	.39	8	.22
7	.37	6	.20	6	.23	6	.15
5	.13	3	.13	3	.10	2	.10
2	.07	2	.02	2	.04	1	.02
.9	.01	.8	.00				

22

PARAMETER VALUES

PS : 1.38	ALPHA : .038	BETA : .0044
(1.27, 1.50)	(.036, .041)	(.0036, .0052)

FRACTION : < 1 MICRON

SAMPLE TEMP 9.9°C INCUBATION TEMP 9.9°C

CHLOROPHYLL : 1.01 NITRATE : .49

CARBON : 94 NITROGEN : 13

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 21/05/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
618	2.20	498	2.08	431	2.36	399	2.67
351	2.40	303	2.72	215	2.71	171	2.86
159	2.98	136	2.54	120	2.28	66	2.15
57	1.92	49	2.05	43	1.85	40	1.75
35	1.38	23	1.39	20	1.37	18	1.02
16	.91	16	.78	7	.47	6	.34
6	.30	5	.25	5	.24	4	.20
3	.14	2	.11	2	.08	2	.07
2	.06	2	.05	1	.03	.9	.02
.8	.02	.5	.01	.4	.00	.3	.01

23

PARAMETER VALUES

PS : 3.08	ALPHA : .065	BETA : .0018
(2.93, 3.23)	(.062, .068)	(.0013, .0023)

FRACTION : WHOLE

SAMPLE TEMP 10.2°C INCUBATION TEMP 10.2°C

CHLOROPHYLL : 2.84 NITRATE : .42

CARBON : 192 NITROGEN : 30

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 21/05/1986 DEPTH 5 M

	P	I	P	I	P	I	P
626	1.85	546	2.45	458	2.58	399	2.75
371	2.78	347	2.78	183	2.68	148	3.00
128	2.81	120	2.78	104	2.60	96	2.59
59	2.54	51	2.40	45	2.41	40	1.85
36	1.57	34	1.17	24	1.23	20	1.09
17	1.02	15	.84	14	.64	13	.59
8	.50	6	.35	6	.24	5	.18
5	.15	5	.14	3	.09	2	.06
2	.03	2	.04	2	.05	2	.03
1	.01						

24

PARAMETER VALUES

PS :	3.50	ALPHA :	.065	BETA :	.0026
(	3.27, 3.73 )	(	.062, .069 )	(	.0019, .0034)

FRACTION : > 1 MICRON

SAMPLE TEMP	10.2°C	INCUBATION TEMP	10.2°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	1.92	NITRATE :	.42
---------------	------	-----------	-----

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 21/05/1986

DEPTH 5 M

I	P	I	P	I	P	I	P
626	1.69	546	1.48	458	2.00	399	1.55
347	2.18	183	1.59	148	2.02	128	1.78
120	1.65	104	1.67	96	1.46	59	1.88
40	1.49	36	1.27	34	1.49	24	1.18
20	1.12	17	.79	15	.58	14	.75
13	.45	6	.40	6	.31	5	.35
5	.26	5	.20	3	.10	2	.06
2	.06	2	.05	2	.01	2	.05
1	.04	9	.02	.8	.02		

25

PARAMETER VALUES

PS : 1.83
(1.73, 1.94)ALPHA : .067
(.061, .073)BETA : .0002
(-.0001, .0005)

FRACTION : < 1 MICRON

SAMPLE TEMP

10.2°C

INCUBATION TEMP

10.2°C

CHLOROPHYLL : .60

NITRATE : .42

CARBON : 87

NITROGEN : 14

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 21/05/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
618	1.87	498	2.39	431	2.54	399	2.71
351	2.68	303	3.03	215	3.41	171	3.25
159	3.29	144	3.19	136	3.11	120	3.00
66	2.81	57	2.78	49	2.43	43	2.25
40	2.19	35	1.92	23	2.01	20	1.72
18	1.45	16	1.23	16	1.03	16	.93
7	.71	6	.52	6	.42	5	.36
5	.29	4	.24	3	.21	2	.16
2	.12	2	.10	2	.09	2	.07
1	.04	.9	.02	.8	.01	.5	.01
.4	.00	.3	.01				

26

PARAMETER VALUES

PS : 3.94	ALPHA : .088	BETA : .0041
(3.79, 4.09)	(.085, .092)	(.0035, .0047)

FRACTION : WHOLE

SAMPLE TEMP 10.2°C INCUBATION TEMP 10.2°C

CHLOROPHYLL : 2.52 NITRATE : .42

CARBON : 228 NITROGEN : 33

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 21/05/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
626	1.91	546	2.55	458	2.67	399	2.42
371	3.27	347	3.38	183	3.35	128	3.32
120	2.84	104	3.14	96	2.81	59	2.84
51	2.53	45	2.58	40	2.19	36	1.81
34	1.42	24	1.44	20	1.21	17	1.11
15	1.00	14	.81	13	.73	8	.65
6	.42	6	.33	5	.27	5	.22
5	.22	3	.12	2	.13	2	.07
2	.06	2	.09	2	.05	1	.04
.9	.07	.8	.01	.4	.01	.4	.01

27

PARAMETER VALUES

PS :	4.25	ALPHA :	.073	BETA :	.0044
(	3.94, 4.57 )	(	.069, .077 )	(	.0033, .0055)

FRACTION : > 1 MICRON

SAMPLE TEMP	10.2°C	INCUBATION TEMP	10.2°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	2.14	NITRATE :	.42
---------------	------	-----------	-----

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 21/05/1986

DEPTH 25 M

I	P	I	P	I	P	I	P
626	.82	546	.84	458	1.34	347	1.55
148	1.43	128	1.41	104	1.31	51	1.14
45	.93	40	1.27	36	1.15	34	1.27
24	1.12	20	.89	17	.74	15	.56
14	.70	13	.44	6	.35	6	.31
5	.33	5	.21	5	.19	3	.11
2	.08	2	.07	2	.05	2	.02
2	.07	1	.04	.9	.02	.8	.02
.4	.01						

28

PARAMETER VALUES

PS : 1.59

(1.48, 1.71)

ALPHA : .057

(.052, .062)

BETA : .0012

(.0008, .0016)

FRACTION : < 1 MICRON

SAMPLE TEMP

10.2°C

INCUBATION TEMP

10.2°C

CHLOROPHYLL : .61

NITRATE : .42

CARBON : 89

NITROGEN : 16

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 23/05/1986

DEPTH 30 M

I	P	I	P	I	P	I	P
658	.96	530	1.64	470	3.23	415	2.74
379	3.33	343	3.59	187	3.60	148	3.57
128	3.60	112	3.44	98	3.32	93	2.98
59	3.17	47	3.12	41	2.60	37	2.88
33	2.63	32	2.40	24	2.10	20	2.00
18	1.58	17	1.43	16	1.25	16	1.06
8	.74	7	.68	6	.49	5	.29
5	.31	4	.27	3	.24	2	.23
2	.17	2	.14	2	.11	2	.13
1	.05	.9	.06	.8	.04	.4	.03
.3	.02	.3	.02				

PARAMETER VALUES

PS :	4.62	ALPHA :	.107	BETA :	.0062
(	4.26, 4.97)	(	.099, .115)	(	.0047, .0077)

FRACTION : WHOLE

SAMPLE TEMP	10.2°C	INCUBATION TEMP	10.2°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	2.56	NITRATE :	.88
---------------	------	-----------	-----

CARBON :	281	NITROGEN :	43
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 23/05/1986 DEPTH 30 M

I	P	I	P	I	P	I	P
606	1.27	518	2.35	450	2.84	411	2.80
359	3.25	311	3.34	211	3.40	183	3.50
163	3.54	155	3.41	148	3.38	140	3.07
76	3.21	66	2.79	54	2.67	49	2.31
48	2.06	47	1.95	27	1.71	23	1.21
20	1.37	18	1.21	17	1.10	16	.94
9	.62	7	.54	7	.44	6	.39
5	.33	5	.30	4	.18	3	.17
3	.15	2	.13	2	.10	2	.08
1	.05	1	.04	1	.03	.6	.01
.4	.00	.4	.01				

PARAMETER VALUES

PS : 5.25	ALPHA : .069	BETA : .0085
(4.83, 5.68)	(.065, .072)	(.0068, .0103)

FRACTION : >1 MICRON

SAMPLE TEMP	10.2°C	INCUBATION TEMP	10.2°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	2.02	NITRATE :	.88
---------------	------	-----------	-----

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 23/05/1986

DEPTH 30 M

I	P	I	P	I	P	I	P
606	1.11	518	1.78	450	1.69	411	1.81
359	2.16	311	2.48	211	2.00	183	1.92
163	2.38	155	2.09	148	2.44	140	2.06
66	1.54	54	1.61	49	2.17	48	1.62
47	1.41	27	1.66	23	1.26	20	1.46
18	1.06	16	.73	9	.56	7	.59
7	.39	6	.36	5	.37	5	.29
4	.22	3	.16	3	.08	2	.10
2	.08	2	.09	1	.05	1	.03
1	.04	.6	.05	.4	.01		

PARAMETER VALUES

PS :	2.49	ALPHA :	.070	BETA :	.0019
(	2.31, 2.67 )	(	.064, .076 )	(	.0012, .0026)

FRACTION : < 1 MICRON

SAMPLE TEMP 10.2°C INCUBATION TEMP 10.2°C

CHLOROPHYLL : .44 NITRATE : .88

CARBON : 83 NITROGEN : 11

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 24/05/1986 DEPTH 40 M

I	P	I	P	I	P	I	P
658	.32	530	.98	470	1.74	415	2.33
379	2.58	343	3.13	187	3.40	112	3.43
98	3.24	93	3.54	59	3.02	47	2.83
41	2.89	37	2.82	33	2.70	32	2.41
24	2.34	20	2.16	18	1.67	17	1.43
16	1.39	8	.89	7	.69	6	.63
5	.56	5	.46	4	.42	3	.30
2	.23	2	.19	2	.14	2	.18
2	.13	1	.10	.9	.07	.8	.08
.4	.04	.3	.03	.3	.01		

PARAMETER VALUES

PS : 5.15	ALPHA : .115	BETA : .0118
(4.69, 5.61)	(.108, .122)	(.0094, .0143)

FRACTION : WHOLE

SAMPLE TEMP 10.2°C INCUBATION TEMP 10.2°C

CHLOROPHYLL : 1.42 NITRATE : .20

CARBON : 173 NITROGEN : 26

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 24/05/1986 DEPTH 40 M

I	P	I	P	I	P	I	P
606	.28	518	.78	450	1.31	411	1.72
359	2.08	311	2.31	211	2.49	183	2.20
163	2.16	155	2.37	148	2.23	140	2.46
76	2.19	66	2.31	54	2.14	49	1.87
48	1.75	27	1.48	23	1.41	20	1.38
18	1.02	17	.90	16	.81	9	.59
7	.53	7	.46	6	.30	5	.35
5	.34	4	.19	3	.16	3	.14
2	.11	2	.10	2	.07	1	.07
1	.02	1	.05				

33

PARAMETER VALUES

PS :	3.79	ALPHA :	.067	BETA :	.0090
(	3.40, 4.18 )	(	.062, .072 )	(	.0068, .0112)

FRACTION : > 1 MICRON

SAMPLE TEMP 10.2°C INCUBATION TEMP 10.2°C

CHLOROPHYLL : 1.32 NITRATE : .20

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 24/05/1986 DEPTH 40 M

	I	P	I	P	I	P	I	P
606	.22	518	.58	450	.60	411	1.27	
359	1.25	311	1.85	211	1.80	183	1.63	
163	1.78	155	2.04	148	1.73	66	1.81	
54	1.91	49	1.54	48	1.56	47	1.68	
27	1.60	23	1.26	20	.90	18	.94	
17	.84	16	.96	9	.70	7	.60	
7	.54	6	.42	5	.28	5	.23	
4	.27	3	.21	3	.17	2	.12	
2	.11	2	.11	1	.11	1	.05	
1	.09	.4	.02					

PARAMETER VALUES

PS : 2.94	ALPHA : .068	BETA : .0078
(2.65, 3.23)	(.063, .073)	(.0060, .0096)

FRACTION : < 1 MICRON

SAMPLE TEMP 10.2°C INCUBATION TEMP 10.2°C

CHLOROPHYLL : .25 NITRATE : .20

CARBON : 84 NITROGEN : 13

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 25/05/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
646	3.05	486	3.29	447	3.17	431	3.30
375	3.39	319	3.75	187	3.07	155	3.09
140	3.45	132	3.39	124	3.29	112	3.34
66	2.58	56	2.71	50	2.64	44	2.46
41	1.97	40	1.95	22	1.74	19	1.50
16	1.40	15	1.25	15	1.00	12	.86
8	.62	6	.53	6	.41	5	.33
5	.31	4	.28	3	.18	2	.13
2	.10	2	.08	2	.07	1	.05
.9	.04	.6	.02	.5	.01	.5	.03

35

PARAMETER VALUES

PS : 3.49 ALPHA : .089 BETA : .0005
(3.37, 3.61) (.085, .093) (.0002, .0008)

FRACTION : WHOLE

SAMPLE TEMP 10.4°C INCUBATION TEMP 10.4°C

CHLOROPHYLL : 2.24 NITRATE : .38

CARBON : 181 NITROGEN : 27

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 25/05/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
710	2.75	566	3.03	458	3.40	411	2.91
387	3.54	319	3.28	187	3.01	155	3.39
132	3.06	116	2.70	104	3.14	86	2.89
62	2.52	51	2.60	42	2.15	37	2.12
35	1.89	33	1.56	26	1.49	21	1.44
19	1.07	18	.95	16	1.01	8	.42
7	.41	6	.41	5	.25	4	.24
4	.22	3	.12	2	.10	2	.08
2	.05	2	.06	2	.04	1	.01
.8	.02	.7	.01	.4	.02	.3	.01
.3	.02						

PARAMETER VALUES

PS :	3.46	ALPHA :	.076	BETA :	.0008
(	3.32, 3.60 )	(	.072, .079 )	(	.0004, .0012)

FRACTION : > 1 MICRON

SAMPLE TEMP	10.4°C	INCUBATION TEMP	10.4°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	1.67	NITRATE :	.38
---------------	------	-----------	-----

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 25/05/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
710	1.55	566	1.33	458	1.17	411	1.43
387	1.60	187	1.48	155	1.48	132	1.85
116	1.91	104	1.41	62	1.36	51	1.42
42	1.68	37	1.39	35	1.27	33	1.31
26	1.37	21	.84	18	.68	16	.67
15	.55	8	.36	7	.33	6	.30
5	.29	4	.21	4	.13	3	.12
2	.10	2	.08	2	.06	2	.04

37

PARAMETER VALUES

PS :	1.75	ALPHA :	.064	BETA :	.0007
(	1.64, 1.85 )	(	.058, .070 )	(	.0004, .0010)

FRACTION : < 1 MICRON

SAMPLE TEMP 10.4°C INCUBATION TEMP 10.4°C

CHLOROPHYLL : .54 NITRATE : .38

CARBON : 96 NITROGEN : 13

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 25/05/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
646	2.83	486	3.64	447	3.87	431	3.77
375	3.98	319	4.06	187	3.49	155	3.84
140	3.74	132	3.88	124	3.94	112	3.66
66	3.03	56	3.14	50	2.95	44	2.83
41	2.51	22	2.12	19	1.90	16	1.53
15	1.33	15	1.09	12	.89	8	.64
6	.50	6	.40	5	.31	5	.30
4	.23	3	.19	2	.14	2	.09
2	.07	2	.07	1	.05	.9	.02
.6	.00	.5	.00				

30

PARAMETER VALUES

PS :	4.22	ALPHA :	.102	BETA :	.0015
(	4.05, 4.38 )	(	.097, .107 )	(	.0010, .0020)

FRACTION : WHOLE

SAMPLE TEMP 10.4°C INCUBATION TEMP 10.4°C

CHLOROPHYLL : 2.26 NITRATE : .26

CARBON : 246 NITROGEN : 32

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 25/05/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
710	3.25	566	3.79	458	4.17	411	4.10
387	4.38	319	4.61	187	3.90	155	3.91
132	3.66	116	3.40	104	3.15	86	3.39
62	3.32	51	3.30	42	2.68	37	2.63
35	2.15	33	1.90	26	1.62	21	1.58
19	1.21	18	1.33	16	.99	15	.70
8	.44	7	.49	6	.30	5	.29
4	.23	4	.24	3	.12	2	.12
2	.05	2	.05	2	.04	2	.03
1	.01	.8	.00	.7	.00		

PARAMETER VALUES

PS :	4.44	ALPHA :	.083	BETA :	.0012
(	4.17, 4.71 )	(	.078, .088 )	(	.0005, .0018)

FRACTION : >1 MICRON

SAMPLE TEMP 10.4°C INCUBATION TEMP 10.4°C

CHLOROPHYLL : 1.63 NITRATE : .26

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 25/05/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
710	1.25	566	1.54	458	1.15	411	1.11
387	1.07	319	1.44	187	1.27	155	1.50
132	1.67	104	1.58	62	1.41	51	1.54
37	1.44	35	1.29	33	1.52	26	1.31
21	1.00	19	.77	18	.74	16	.76
15	.59	8	.41	7	.42	6	.41
4	.22	4	.20	3	.16	2	.13
2	.10	2	.06	2	.05	1	.02
.8	.01						

07

PARAMETER VALUES

PS : 1.65	ALPHA : .071	BETA : .0009
(1.55, 1.75)	(.065, .078)	(.0006, .0012)

FRACTION : < 1 MICRON

SAMPLE TEMP	10.4°C	INCUBATION TEMP	10.4°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.50	NITRATE :	.26
---------------	-----	-----------	-----

CARBON :	84	NITROGEN :	11
----------	----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 26/05/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
614	2.00	478	2.32	419	2.33	391	2.96
343	2.39	299	2.97	211	3.04	175	3.02
151	2.55	136	2.72	120	3.09	116	2.68
75	2.50	64	2.18	54	2.19	53	1.93
50	1.62	46	1.75	26	1.77	22	1.59
20	1.17	20	1.14	18	.98	16	.85
9	.68	7	.36	7	.33	7	.31
6	.23	6	.20	4	.11	3	.12
3	.08	3	.06	2	.06	2	.05
1	.01	1	.01	.9	.01		

PARAMETER VALUES

PS : 3.50 ALPHA : .064 BETA : .0029
(3.25, 3.75) (.060, .068) (.0020, .0038)

FRACTION : WHOLE

SAMPLE TEMP 10.4°C INCUBATION TEMP 10.4°C

CHLOROPHYLL : 1.87 NITRATE : .26

CARBON : 346 NITROGEN : 48

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 26/05/1986

DEPTH 15 M

I	P	I	P	I	P	I	P
670	2.23	526	2.63	458	2.69	407	2.52
359	2.87	323	3.18	187	2.76	155	2.61
132	2.68	120	2.63	96	2.33	85	2.61
60	2.06	50	2.24	44	2.02	38	1.85
34	1.68	32	1.85	24	1.29	21	1.21
19	1.07	16	.85	16	.84	14	.60
8	.41	7	.35	6	.25	5	.16
5	.16	5	.18	3	.10	3	.08
2	.05	2	.02	2	.05	2	.02

42

PARAMETER VALUES

PS : 3.04
(2.89, 3.18)ALPHA : .068
(.065, .072)BETA : .0010
(.0005, .0014)

FRACTION : > 1 MICRON

SAMPLE TEMP

10.4°C

INCUBATION TEMP

10.4°C

CHLOROPHYLL :

1.38

NITRATE :

.26

CARBON :

-

NITROGEN :

-

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 26/05/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
670	2.03	526	1.80	407	1.57	359	1.66
187	1.69	155	1.72	96	1.59	60	1.36
50	1.51	38	1.61	34	1.55	24	1.52
21	1.11	16	.90	16	.75	14	.80
8	.45	7	.38	6	.47	5	.39
5	.23	5	.16	3	.16	3	.12
2	.10	2	.08	2	.08	2	.07
1	.07	.9	.03	.8	.01		

43

PARAMETER VALUES

PS :	1.73	ALPHA :	.080	BETA :	.0000
(	1.64, 1.82 )	(	.074, .087 )	(	-.0002, .0002)

FRACTION : < 1 MICRON

SAMPLE TEMP 10.4°C INCUBATION TEMP 10.4°C

CHLOROPHYLL : .34 NITRATE : .26

CARBON : 112 NITROGEN : 18

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 26/05/1986 DEPTH 20 M

I	P	I	P	I	P	I	P
614	1.64	478	2.76	419	3.24	391	3.09
343	3.35	299	2.92	211	3.25	175	3.22
151	3.04	136	3.26	120	3.28	116	3.04
75	2.50	64	2.48	54	2.68	53	2.15
50	2.10	46	1.96	26	1.68	22	1.67
20	1.23	20	1.05	18	1.00	16	.89
9	.54	7	.43	7	.31	7	.27
6	.22	6	.22	4	.18	3	.12
3	.10	3	.07	2	.06	2	.06
1	.02	1	.02	.9	.02	.6	.01
.5	.01	.4	.01				

PARAMETER VALUES

PS : 4.32 ALPHA : .066 BETA : .0045
(3.98, 4.66) (.062, .069) (.0033, .0058)

FRACTION : WHOLE

SAMPLE TEMP 10.6°C INCUBATION TEMP 10.6°C

CHLOROPHYLL : 1.82 NITRATE : .40

CARBON : 359 NITROGEN : 52

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 26/05/1986 DEPTH 20 M

	P	I	P	I	P	I	P
670	1.72	526	2.86	458	3.10	407	2.83
359	3.14	323	3.20	187	2.95	155	2.58
132	2.90	120	2.86	96	2.74	85	2.83
60	2.38	50	2.74	44	2.26	38	2.28
34	1.91	32	1.62	24	1.46	21	1.22
19	1.19	16	1.15	16	.91	14	.74
8	.58	7	.41	6	.31	5	.20
5	.21	5	.24	3	.15	3	.11
2	.08	2	.12	2	.05	2	.04
1	.01	.9	.01				

45

PARAMETER VALUES

PS : 3.40	ALPHA : .079	BETA : .0017
(3.19, 3.61)	(.074, .084)	(.0011, .0024)

FRACTION : > 1 MICRON

SAMPLE TEMP 10.6°C INCUBATION TEMP 10.6°C

CHLOROPHYLL : 1.40 NITRATE : .40

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 26/05/1986

DEPTH 20 M

I	P	I	P	I	P	I	P
670	1.06	526	.97	458	.85	407	1.09
359	1.20	323	1.51	187	1.35	132	1.42
120	1.60	96	1.17	50	1.03	44	1.43
38	1.09	34	.95	32	1.04	24	.98
21	.77	19	.59	16	.66	16	.51
14	.59	8	.38	7	.36	6	.31
5	.29	5	.24	5	.19	3	.15
3	.09	2	.09	2	.06	2	.04
2	.04	1	.05	.9	.03		

47

PARAMETER VALUES

PS : 1.60

(1.50, 1.71)

ALPHA : .051

(.047, .055)

BETA : .0013

(.0009, .0017)

FRACTION : < 1 MICRON

SAMPLE TEMP

10.6°C

INCUBATION TEMP

10.6°C

CHLOROPHYLL :

.45

NITRATE :

.40

CARBON :

85

NITROGEN :

12

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 27/05/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
614	1.59	478	1.95	419	2.50	391	2.52
343	2.80	299	2.93	211	2.94	175	2.99
151	2.88	136	2.48	120	2.55	116	2.69
64	2.59	53	2.28	50	1.79	46	1.94
26	1.55	22	1.69	20	1.24	20	1.16
18	.95	16	.85	9	.40	7	.55
7	.42	7	.28	6	.28	6	.26
4	.21	3	.13	3	.03	3	.14
2	.08	2	.03	1	.01		

/4

PARAMETER VALUES

PS : 3.63 ALPHA : .067 BETA : .0038
(3.37, 3.88) (.063, .072) (.0028, .0049)

FRACTION : WHOLE

SAMPLE TEMP 10.4°C INCUBATION TEMP 10.4°C

CHLOROPHYLL : 1.68 NITRATE : .87

CARBON : 236 NITROGEN : 31

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 27/05/1986

DEPTH 25 M

I	P	I	P	I	P	I	P
670	1.34	526	2.23	458	2.57	407	2.42
359	2.57	323	2.79	187	2.62	155	2.79
132	2.50	120	2.56	96	2.54	85	2.52
60	2.27	50	2.45	44	2.12	38	2.01
34	1.65	32	1.24	24	1.42	21	1.09
19	1.16	16	.87	16	.71	14	.52
8	.52	7	.39	6.	.31	5	.26
5	.29	5	.22	3	.13	3	.10
2	.09	2	.07	2	.05	2	.06
1	.03						

87

PARAMETER VALUES

PS : 3.37	ALPHA : .068	BETA : .0030
(3.15, 3.59)	(.064, .072)	(.0022, .0038)

FRACTION : > 1 MICRON

SAMPLE TEMP

10.4°C

INCUBATION TEMP

10.4°C

CHLOROPHYLL :

1.29

NITRATE :

.87

CARBON :

-

NITROGEN :

-

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 27/05/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
670	2.05	526	2.00	458	1.84	407	1.72
359	1.81	187	2.12	155	2.04	96	1.97
85	1.64	60	1.87	50	1.87	38	1.98
34	1.63	32	1.31	24	1.67	21	1.12
19	.82	16	.92	16	.76	14	.79
8	.72	7	.49	6	.49	5	.43
5	.24	5	.18	3	.15	3	.12
2	.14	2	.10	2	.07	2	.06
1	.07	.9	.03	.8	.00		

49

PARAMETER VALUES

PS : 2.02	ALPHA : .083	BETA : .0002
(1.92, 2.13)	(.076, .089)	(-.0001, .0005)

FRACTION : <1 MICRON

SAMPLE TEMP	10.4°C	INCUBATION TEMP	10.4°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.34	NITRATE :	.87
---------------	-----	-----------	-----

CARBON :	86	NITROGEN :	12
----------	----	------------	----

CHARLES DARWIN 1986

LAT	50°30' N	LONG	7° 0' W	DATE	29/05/1986	DEPTH	5 M
I	P	I	P	I	P	I	P
658	2.86	538	2.73	478	3.90	439	3.26
399	3.21	335	3.97	223	3.45	187	3.46
163	3.20	151	3.36	144	3.10	124	3.51
75	2.96	65	3.01	62	2.76	54	2.62
51	2.28	47	2.14	27	1.82	24	1.61
22	1.38	20	1.07	17	1.04	15	.96
9	.68	7	.42	7	.38	6	.32
6	.28	5	.28	4	.21	3	.15
3	.12	3	.08	3	.08	2	.08
1	.01	1	.01				

PARAMETER VALUES

PS : 3.84 ALPHA : .077 BETA : .0014
(3.64, 4.04) (.072, .082) (.0008, .0019)

FRACTION : WHOLE

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : 1.00 NITRATE : 1.36

CARBON : 174 NITROGEN : 25

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 29/05/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
666	3.09	550	3.01	470	2.40	423	2.74
383	3.30	323	3.17	183	2.84	148	2.88
128	2.72	104	2.27	98	2.83	60	1.88
49	2.55	45	2.28	39	1.53	37	1.75
34	1.79	24	1.09	19	1.14	18	.84
16	.79	14	.80	12	.35	8	.24
7	.38	6	.30	5	.23	4	.08
4	.21	3	.12	2	.05		

51

PARAMETER VALUES

PS : 2.96 ALPHA : .067 BETA : .0000
(2.74, 3.17) (.061, .072) (-.0005, .0006)

FRACTION : >5 MICRON

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .20 NITRATE : 1.36

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT	50°30' N	LONG	7° 0' W	DATE	29/05/1986	DEPTH	5 M
I	P	I	P	I	P	I	P
666	3.05	550	3.41	470	3.57	423	3.12
383	2.88	323	3.47	183	3.35	148	3.74
128	3.65	114	2.93	104	3.35	98	3.01
60	2.69	49	2.71	45	2.43	39	2.34
34	1.77	24	1.75	19	1.61	18	1.36
16	1.15	14	.95	12	.86	8	.65
7	.46	6	.37	5	.39	4	.34
4	.28	3	.18	2	.16	2	.11
2	.10	2	.07	2	.06	1	.03
.8	.03						

52

PARAMETER VALUES

PS :	3.61	ALPHA :	.090	BETA :	.0008
(	3.46, 3.75 )	(	.085, .095 )	(	.0004, .0012)

FRACTION : <5 MICRON

SAMPLE TEMP	10.5°C	INCUBATION TEMP	10.5°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.71	NITRATE :	1.36
---------------	-----	-----------	------

CARBON :	101	NITROGEN :	15
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 29/05/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
658	3.94	538	3.44	478	3.48	439	4.07
399	4.10	223	3.62	163	3.90	151	3.39
144	3.12	124	3.46	75	2.73	65	3.02
62	2.34	54	2.72	51	2.13	47	2.01
27	1.84	24	1.47	22	1.23	20	.89
17	.90	15	.82	9	.52	7	.38
7	.34	6	.24	6	.16	5	.18
4	.09	3	.06	3	.02	3	.04
3	.03	2	.01	1	.01		

53

PARAMETER VALUES

PS : 3.81	ALPHA : .068	BETA : .0001
(3.58, 4.05)	(.064, .072)	(-.0005, .0006)

FRACTION : WHOLE

SAMPLE TEMP	10.5°C	INCUBATION TEMP	10.5°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.68	NITRATE :	.35
---------------	-----	-----------	-----

CARBON :	135	NITROGEN :	19
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 29/05/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
666	3.23	550	3.42	423	2.76	383	3.87
323	3.23	183	2.85	148	3.09	128	2.77
114	2.35	104	2.46	98	2.48	45	1.28
39	1.22	37	1.17	34	1.10	24	.85
19	.72	18	.81	16	.68	14	.60
12	.37	8	.14	7	.22	5	.01

54

PARAMETER VALUES

PS :	3.61	ALPHA :	.040	BETA :	.0006
(	3.19, 4.03 )	(	.037, .043 )	(	-.0003, .0015)

FRACTION : >5 MICRON

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .15 NITRATE : .35

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 29/05/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
666	3.95	550	3.75	423	3.42	383	3.22
323	3.96	183	3.35	148	3.68	128	3.53
114	3.65	104	3.32	98	3.23	60	2.61
49	2.67	45	2.46	39	2.08	37	1.83
34	1.51	24	1.42	19	1.29	16	.91
14	.86	12	.62	8	.49	7	.36
6	.29	5	.18	4	.15	4	.18
3	.12	2	.06	2	.01	2	.01
2	.00						

55

PARAMETER VALUES

PS : 3.75	ALPHA : .075	BETA : .0001
(3.56, 3.94)	(.071, .079)	(-.0003, .0006)

FRACTION : <5 MICRON

SAMPLE TEMP	10.5°C	INCUBATION TEMP	10.5°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.50	NITRATE :	.35
---------------	-----	-----------	-----

CARBON :	82	NITROGEN :	12
----------	----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 30/05/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
638	2.95	518	3.20	447	3.96	367	4.17
211	4.29	179	4.12	151	3.85	128	3.78
112	3.72	76	3.19	70	3.40	57	2.69
53	2.27	51	2.31	44	2.01	26	1.85
24	1.52	23	1.24	22	.88	20	.96
18	.74	9	.63	7	.42	6	.36
6	.29	6	.21	5	.17	3	.12
3	.08	2	.05	2	.09	2	.02

56

PARAMETER VALUES

PS : 6.15 ALPHA : .063 BETA : .0069
(5.56, 6.75) (.061, .066) (.0050, .0088)

FRACTION : WHOLE

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .74 NITRATE : 18.80

CARBON : 123 NITROGEN : 20

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 30/05/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
526	3.00	466	3.58	407	2.99	319	3.45
183	2.71	144	3.09	120	2.88	106	2.46
96	2.83	82	2.92	61	2.42	51	2.15
44	1.97	39	1.70	36	1.45	33	1.22
24	1.28	21	1.17	17	1.02	15	.75
14	.64	14	.44	8	.25	7	.21
6	.29	5	.18	5	.11	3	.01

57

PARAMETER VALUES

PS : 3.23 ALPHA : .061 BETA : .0000
(2.95, 3.50) (.057, .066) (-.0007, .0008)

FRACTION : >5 MICRON

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .14 NITRATE : 18.80

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 30/05/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
622	3.27	526	3.48	466	3.43	407	3.31
339	3.26	319	2.85	183	3.23	144	3.55
120	3.62	106	3.14	96	3.18	82	3.04
61	2.71	51	2.69	44	2.47	39	2.03
36	1.98	33	1.70	24	1.52	21	1.45
17	1.14	15	1.05	14	.95	14	.74
8	.49	7	.41	6	.36	5	.29
5	.23	5	.17	3	.09	3	.11
2	.05	2	.05	2	.04		

55

PARAMETER VALUES

PS : 3.59	ALPHA : .082	BETA : .0006
(3.43, 3.76)	(.078, .086)	(.0002, .0011)

FRACTION : < 5 MICRON

SAMPLE TEMP	10.5°C	INCUBATION TEMP	10.5°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.59	NITRATE :	18.80
---------------	-----	-----------	-------

CARBON :	80	NITROGEN :	15
----------	----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 30/05/1986 DEPTH 20 M

I	P	I	P	I	P	I	P
638	2.89	518	3.56	447	4.13	379	4.00
367	3.87	319	4.18	211	4.26	179	3.76
151	3.88	144	3.99	128	4.15	112	3.13
76	3.26	70	3.50	57	3.17	53	2.90
51	2.18	44	2.15	26	2.03	24	1.64
23	1.50	22	1.28	20	1.14	18	.95
9	.61	7	.38	6	.32	6	.25
6	.26	5	.21	3	.13	3	.07
2	.05	2	.06	2	.05	2	.04

59

PARAMETER VALUES

PS : 5.02	ALPHA : .074	BETA : .0034
(4.65, 5.39)	(.070, .079)	(.0022, .0046)

FRACTION : WHOLE

SAMPLE TEMP	10.5°C	INCUBATION TEMP	10.5°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.64	NITRATE :	1.27
---------------	-----	-----------	------

CARBON :	145	NITROGEN :	25
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 30/05/1986 DEPTH 20 M

I	P	I	P	I	P	I	P
622	3.20	526	3.48	466	3.81	407	4.16
339	3.52	319	3.75	183	3.24	144	3.85
120	3.13	106	3.09	96	2.87	82	2.68
61	2.37	51	2.90	44	1.75	39	2.13
36	1.66	33	1.80	24	1.29	21	1.10
17	.89	14	.68	14	.61	8	.47
7	.34	5	.31	3	.09	3	.04

60

PARAMETER VALUES

PS : 3.97 ALPHA : .064 BETA : .0008
(3.63, 4.31) (.060, .069) (.0000, .0017)

FRACTION : >5 MICRON

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .12 NITRATE : 1.27

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 30/05/1986 DEPTH 20 M

I	P	I	P	I	P	I	P
622	3.54	526	4.10	466	4.12	407	3.91
339	4.19	319	4.38	183	3.94	144	4.41
120	4.22	106	4.03	96	4.11	82	3.53
61	3.02	51	3.15	44	2.86	39	2.52
36	2.24	33	2.11	24	1.67	21	1.62
17	1.30	15	1.20	14	1.02	14	.81
8	.55	7	.43	6	.36	5	.25
5	.24	5	.25	3	.11	3	.12
2	.05	2	.04	2	.03	2	.03

61

PARAMETER VALUES

PS : 4.99	ALPHA : .088	BETA : .0024
(4.77, 5.21)	(.084, .091)	(.0018, .0031)

FRACTION : < 5 MICRON

SAMPLE TEMP	10.5°C	INCUBATION TEMP	10.5°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.48	NITRATE :	1.27
---------------	-----	-----------	------

CARBON :	106	NITROGEN :	12
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 31/05/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
678	1.65	510	2.56	458	2.67	431	2.99
391	3.41	375	3.25	211	3.39	179	2.66
148	2.78	140	3.28	75	2.37	66	2.07
53	2.14	51	1.99	26	1.75	23	1.49
21	1.31	17	1.11	16	1.03	14	.89
8	.63	7	.47	6	.32	5	.31
4	.20	4	.17	3	.14	3	.15
2	.14	2	.08	2	.07	1	.03
1	.01						

62

PARAMETER VALUES

PS : 3.89	ALPHA : .064	BETA : .0031
(3.51, 4.26)	(.058, .069)	(.0019, .0043)

FRACTION : WHOLE

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .80 NITRATE : .28

CARBON : 133 NITROGEN : 19

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 31/05/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
678	2.86	454	3.62	427	3.69	387	3.03
335	3.21	183	3.35	116	2.77	100	2.49
94	3.01	61	2.49	42	1.96	39	1.75
35	1.64	31	1.15	24	1.20	20	1.19
18	.93	15	.54	13	.67	12	.50
8	.21	6	.30	4	.02	3	.07

63

PARAMETER VALUES

PS : 3.71 ALPHA : .058 BETA : .0010
(3.36, 4.06) (.053, .062) (.0001, .0019)

FRACTION : >5 MICRON

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .15 NITRATE : .28

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 31/05/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
678	2.67	454	3.29	427	3.04	387	3.08
335	3.41	183	3.30	148	3.57	136	3.56
116	3.03	100	3.22	94	3.22	61	2.71
50	1.91	42	2.51	39	2.17	35	2.14
31	1.84	24	1.50	20	1.38	18	1.23
15	1.05	13	.97	12	.79	8	.59
7	.57	6	.44	5	.27	5	.27
4	.20	3	.07	2	.12	2	.04
2	.07	2	.01	2	.02	.9	.01

67

PARAMETER VALUES

PS : 3.87	ALPHA : .080	BETA : .0020
(3.71, 4.04)	(.077, .084)	(.0014, .0025)

FRACTION : <5 MICRON

SAMPLE TEMP	10.5°C	INCUBATION TEMP	10.5°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.54	NITRATE :	.28
---------------	-----	-----------	-----

CARBON :	72	NITROGEN :	7
----------	----	------------	---

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 31/50/1986 DEPTH 35 M

I	P	I	P	I	P	I	P
678	.74	570	.75	454	.74	427	.85
387	1.39	335	1.57	183	1.40	148	1.61
116	1.55	100	1.85	94	2.10	61	1.93
50	1.98	42	1.47	39	1.38	35	1.19
31	1.30	24	1.14	20	1.02	18	.90
15	.87	13	.77	12	.52	8	.53
7	.31	6	.31	5	.23	4	.16
3	.21	2	.16	2	.07		

65

PARAMETER VALUES

PS :	2.34	ALPHA :	.068	BETA :	.0045
(	2.16, 2.52 )	(	.063, .073 )	(	.0035, .0054)

FRACTION : >5 MICRON

SAMPLE TEMP	10.4°C	INCUBATION TEMP	10.4°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	1.36	NITRATE :	.62
---------------	------	-----------	-----

CARBON :	113	NITROGEN :	14
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 31/05/1986

DEPTH 35 M

I	P	I	P	I	P	I	P
678	.05	570	.18	454	.44	427	.66
387	1.15	335	1.83	183	2.08	148	2.33
136	2.21	116	2.07	100	2.31	94	1.92
61	1.97	50	2.01	42	2.08	39	1.79
35	1.80	31	1.66	24	1.47	20	1.49
18	1.38	15	1.28	13	1.14	12	.97
8	.62	7	.60	6	.55	5	.43
5	.43	4	.34	3	.24	2	.20
2	.16	2	.16	2	.12	2	.10
.9	.06	.8	.07	.6	.04	.4	.02
.3	.01	.3	.01				

PARAMETER VALUES

PS : 3.42
(3.13, 3.71)ALPHA : .090
(.084, .096)BETA : .0112
(.0091, .0134)

FRACTION : <5 MICRON

SAMPLE TEMP

10.4°C

INCUBATION TEMP

10.4°C

CHLOROPHYLL : .22

NITRATE : .62

CARBON : -

NITROGEN : 0

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 01/06/1986 DEPTH 35 M

I	P	I	P	I	P	I	P
610	.24	486	.20	419	.25	399	.32
323	.57	295	.85	151	1.67	132	1.57
120	1.65	112	1.66	108	1.70	67	1.81
56	1.73	48	1.51	44	1.37	39	1.41
36	1.35	23	1.52	19	.93	18	1.16
17	1.03	16	.69	15	.70	7	.57
6	.47	6	.37	5	.32	5	.27
5	.23	3	.22	2	.16	2	.12
2	.09	2	.07	2	.06	1	.04
.7	.00	.4	.01				

67

PARAMETER VALUES

PS :	3.49	ALPHA :	.068	BETA :	.0187
(	3.06, 3.93 )	(	.064, .071 )	(	.0144, .0230)

FRACTION : WHOLE

SAMPLE TEMP	10.4°C	INCUBATION TEMP	10.4°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	1.09	NITRATE :	.62
---------------	------	-----------	-----

CARBON :	95	NITROGEN :	10
----------	----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 01/06/1986

DEPTH 35 M

	I	P	I	P	I	P	I	P
678	.07		518	.16	470	.28	407	.35
367	.64		319	.94	195	1.32	159	1.34
136	1.25		128	1.35	108	1.21	92	1.44
60	1.26		49	1.29	45	1.16	41	1.00
34	1.03		31	.94	21	1.12	19	.89
18	.77		17	.61	16	.55	8	.45
6	.42		5	.30	5	.27	4	.25
4	.23		3	.13	2	.15	2	.06
2	.06		2	.07	2	.06	.9	.04
.7	.02		.5	.03				

68

PARAMETER VALUES

PS :	2.33	ALPHA :	.051	BETA :	.0089
(	2.07, 2.59 )	(	.048, .055 )	(	.0069, .0109)

FRACTION : > 1 MICRON

SAMPLE TEMP 10.4°C INCUBATION TEMP 10.4°C

CHLOROPHYLL : 1.25 NITRATE : .28

CARBON : 128 NITROGEN : 13

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 01/06/1986 DEPTH 35 M

I	P	I	P	I	P	I	P
678	.03	518	.13	470	.25	407	.52
367	.85	319	1.25	195	1.45	159	1.43
108	1.46	92	1.33	60	1.33	49	1.26
45	1.56	41	1.39	34	1.36	31	1.49
24	1.37	21	1.00	19	.76	18	.86
17	.69	16	.71	8	.60	6	.48
5	.55	5	.43	4	.33	4	.16
3	.16	2	.11	2	.12	2	.10
2	.10	2	.08	.9	.08	.7	.09
.5	.00						

69

PARAMETER VALUES

PS : 2.22	ALPHA : .070	BETA : .0071
(1.97, 2.47)	(.063, .076)	(.0053, .0090)

FRACTION : < 1 MICRON

SAMPLE TEMP	10.4°C	INCUBATION TEMP	10.4°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	1.00	NITRATE :	.28
---------------	------	-----------	-----

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 01/06/1986 DEPTH 30 M

I	P	I	P	I	P	I	P
610	.05	486	.12	419	.20	399	.46
323	.64	295	1.26	179	1.64	151	2.02
132	2.04	120	2.21	112	2.02	67	2.04
56	2.15	48	1.78	44	2.02	39	1.89
36	1.78	23	1.81	19	1.73	18	1.43
17	1.24	16	1.17	15	1.03	7	.80
6	.72	6	.50	5	.49	5	.45
5	.37	3	.29	2	.23	2	.19
2	.23	2	.12	2	.12	1	.09
.7	.05	.6	.05	.4	.01		

PARAMETER VALUES

PS : 3.99	ALPHA : .097	BETA : .0205
(3.54, 4.44)	(.091, .102)	(.0159, .0250)

FRACTION : WHOLE

SAMPLE TEMP 10.6°C INCUBATION TEMP 10.6°C

CHLOROPHYLL : .23 NITRATE : .28

CARBON : 77 NITROGEN : 7

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 01/06/1986 DEPTH 30 M

I	P	I	P	I	P	I	P
678	.03	518	.20	470	.42	407	.43
367	.88	319	1.16	195	1.49	159	1.44
136	1.47	128	1.39	108	1.34	60	1.49
49	1.56	45	1.47	41	1.37	34	1.28
31	1.00	24	1.05	21	1.06	19	1.00
18	.89	17	.80	16	.57	8	.47
6	.45	5	.31	5	.26	4	.24
4	.22	2	.13	2	.10	2	.08
2	.08	2	.05	.9	.02	.7	.02
.5	.02						

71

PARAMETER VALUES

PS : 2.46	ALPHA : .062	BETA : .0085
(2.23, 2.69)	(.058, .066)	(.0067, .0102)

FRACTION : > 1 MICRON

SAMPLE TEMP	10.6°C	INCUBATION TEMP	10.6°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	1.72	NITRATE :	2.06
---------------	------	-----------	------

CARBON :	231	NITROGEN :	29
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 01/06/1986

DEPTH 30 M

I	P	I	P	I	P	I	P
678	.00	518	.13	470	.23	407	.30
367	.48	319	.80	195	.92	159	.83
136	1.01	108	.84	60	.79	49	.75
41	.96	34	.85	31	.91	24	.90
21	.75	19	.65	18	.63	17	.55
16	.55	8	.48	6	.38	5	.39
5	.30	4	.27	3	.14	2	.16
2	.19	2	.19	2	.15	2	.09
.9	.07	.7	.01	.5	.01	.4	.01

72

PARAMETER VALUES

PS : 1.21
(1.09, 1.31)ALPHA : .059
(.053, .066)BETA : .0033
(.0025, .0040)

FRACTION : < 1 MICRON

SAMPLE TEMP

10.6°C

INCUBATION TEMP

10.6°C

CHLOROPHYLL : 1.51

NITRATE : 2.06

CARBON : -

NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 02/06/1986 DEPTH 20 M

I	P	I	P	I	P	I	P
610	2.15	486	2.65	419	3.68	323	3.55
295	3.50	151	3.05	132	3.44	120	2.70
112	2.50	108	2.95	67	2.58	56	2.71
48	2.59	44	2.22	39	2.06	36	1.96
23	1.16	19	.82	18	1.23	17	.77
16	.68	15	.72	7	.38	6	.26
6	.24	5	.07	5	.17	5	.10
3	.07						

73

PARAMETER VALUES

PS :	4.14	ALPHA :	.064	BETA :	.0031
(	3.61, 4.67 )	(	.059, .070 )	(	.0014, .0049)

FRACTION : > 1 MICRON

SAMPLE TEMP 10.6°C INCUBATION TEMP 10.6°C

CHLOROPHYLL : .49 NITRATE : 2.06

CARBON : 69 NITROGEN : 6

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 02/06/1986 DEPTH 20 M

I	P	I	P	I	P	I	P
610	2.04	486	2.90	419	2.74	399	2.59
323	2.66	295	2.88	179	2.72	151	2.85
132	2.53	112	2.54	108	3.02	67	2.21
56	2.30	48	2.43	44	2.36	39	1.98
36	2.04	23	1.82	19	1.64	18	1.42
17	1.17	16	.96	15	.98	7	.57
6	.51	6	.42	5	.30	5	.22
5	.14	3	.11	2	.13	2	.04
2	.06	2	.03				

74

PARAMETER VALUES

PS : 2.94	ALPHA : .093	BETA : .0009
(2.79, 3.08)	(.087, .099)	(.0004, .0013)

FRACTION : <1 MICRON

SAMPLE TEMP	10.6°C	INCUBATION TEMP	10.6°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.56	NITRATE :	2.33
---------------	-----	-----------	------

CARBON :	149	NITROGEN :	21
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 02/06/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
518	4.79	470	4.29	407	4.51	367	4.37
319	4.65	195	4.11	159	4.09	136	3.87
128	3.75	108	3.48	92	2.81	60	2.76
49	2.37	45	2.08	41	1.65	34	1.25
31	1.13	24	1.19	21	.93	19	.71
18	.66	17	.43	16	.42	8	.26
6	.19	5	.10	5	.09	4	.10
4	.07	3	.08	2	.03	2	.01
2	.03						

75

PARAMETER VALUES

PS : 5.36	ALPHA : .052	BETA : .0018
(4.64, 6.08)	(.049, .055)	(.0000, .0037)

FRACTION : WHOLE

SAMPLE TEMP	11.2°C	INCUBATION TEMP	11.2°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.37	NITRATE :	2.33
---------------	-----	-----------	------

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 02/06/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
610	2.83	486	2.86	419	3.35	399	2.53
323	3.16	295	3.07	179	3.03	151	2.67
132	2.50	120	2.81	67	2.77	56	2.47
48	2.59	44	2.02	39	1.52	36	1.57
23	1.06	19	.80	18	.96	17	.58
16	.39	15	.34	7	.27	6	.25
6	.24	5	.08	3	.09	2	.09

76

PARAMETER VALUES

PS :	3.23	ALPHA :	.062	BETA :	.0007
(	2.90, 3.55 )	(	.056, .068 )	(	-.0002, .0016)

FRACTION : > 1 MICRON

SAMPLE TEMP	11.2°C	INCUBATION TEMP	11.2°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.16	NITRATE :	2.33
---------------	-----	-----------	------

CARBON :	62	NITROGEN :	8
----------	----	------------	---

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 02/06/1986 DEPTH 10 M

I	P	I	P	I	P	I	P
610	3.26	486	3.07	419	3.27	399	2.73
323	2.95	295	3.04	179	3.10	151	2.68
132	2.86	120	2.53	112	2.14	108	2.41
67	2.32	56	2.15	48	2.16	44	1.66
39	1.42	36	1.57	23	1.24	19	.87
18	.68	17	.59	16	.54	15	.47
6	.13	6	.07				

77

PARAMETER VALUES

PS :	3.04	ALPHA :	.054	BETA :	.0000
(	2.79, 3.28 )	(	.049, .058 )	(	-.0006, .0006)

FRACTION : < 1 MICRON

SAMPLE TEMP 11.2°C INCUBATION TEMP 11.2°C

CHLOROPHYLL : .43 NITRATE : .52

CARBON : 143 NITROGEN : 18

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 03/06/1986

DEPTH 25 M

I	P	I	P	I	P	I	P
518	.75	423	.98	379	1.54	335	1.84
311	1.81	283	2.32	151	2.48	124	2.83
101	2.70	92	2.76	88	2.40	73	2.28
49	2.36	40	2.19	35	2.04	32	1.95
28	1.82	22	1.45	20	1.64	17	1.38
15	.99	13	1.04	12	.83	11	.67
7	.56	5	.40	4	.34	4	.33
3	.32	3	.24	2	.15	2	.11
2	.08	2	.07	2	.05	1	.03
.9	.03						

78

PARAMETER VALUES

PS : 3.91

(3.63, 4.18)

ALPHA : .090

(.086, .095)

BETA : .0101

(.0084, .0118)

FRACTION : WHOLE

SAMPLE TEMP

10.7°C

INCUBATION TEMP

10.7°C

CHLOROPHYLL : .32

NITRATE : .52

CARBON : -

NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 03/06/1986

DEPTH 25 M

I	P	I	P	I	P	I	P
526	.47	415	.70	359	.65	339	1.18
303	1.59	259	1.86	175	1.95	144	2.23
132	2.21	124	1.98	116	1.92	102	2.30
62	1.95	52	2.17	46	1.82	43	1.27
38	1.82	36	1.45	22	1.33	18	1.26
16	1.23	15	1.05	14	.82	14	.72
8	.49	6	.46	5	.37	5	.24
5	.23	4	.24	3	.17	2	.15
2	.09	2	.04	2	.09	2	.04

79

PARAMETER VALUES

PS : 3.73	ALPHA : .071	BETA : .0132
(3.24, 4.22)	(.066, .076)	(.0096, .0169)

FRACTION : > 1 MICRON

SAMPLE TEMP 10.7°C INCUBATION TEMP 10.7°C

CHLOROPHYLL : .14 NITRATE : .52

CARBON : 97 NITROGEN : 6

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 03/06/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
526	.58	415	.83	359	1.09	339	1.46
303	1.73	259	1.89	175	2.01	144	2.25
132	2.41	124	2.26	116	2.38	102	2.18
62	1.96	52	1.90	46	2.19	43	2.12
38	1.93	36	1.93	22	1.87	18	1.52
16	1.25	15	1.27	14	1.03	14	1.10
8	.70	6	.59	5	.61	5	.48
5	.38	4	.27	3	.27	2	.28
2	.20	2	.13	2	.08	2	.16
1	.08	1	.02	.8	.01	.5	.06
.4	.04						

80

PARAMETER VALUES

PS :	3.15	ALPHA :	.101	BETA :	.0080
(	2.97, 3.33 )	(	.096, .107 )	(	.0068, .0093)

FRACTION : < 1 MICRON

SAMPLE TEMP 10.7°C INCUBATION TEMP 10.7°C

CHLOROPHYLL : .92 NITRATE : 2.37

CARBON : 141 NITROGEN : 19

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 03/06/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
458	.96	335	1.84	291	1.98	259	2.38
207	2.51	128	2.57	101	2.37	98	2.36
85	2.61	73	2.33	55	2.47	47	2.55
40	2.13	38	2.05	36	2.12	32	1.33
18	1.19	15	.94	13	.93	11	.90
10	.68	10	.60	4	.16	3	.20
3	.12	3	.26	3	.17	3	.18
3	.28	2	.06	2	.09	2	.06

81

PARAMETER VALUES

PS : 3.77	ALPHA : .081	BETA : .0087
(3.37, 4.17)	(.076, .087)	(.0062, .0111)

FRACTION : >3 MICRON

SAMPLE TEMP	10.7°C	INCUBATION TEMP	10.7°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.56	NITRATE :	2.37
---------------	-----	-----------	------

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 03/06/1986 DEPTH 25 M

I	P	I	P	I	P	I	P
458	1.11	335	1.66	291	1.79	259	2.08
239	2.36	207	2.73	128	2.44	101	2.42
98	2.66	85	2.43	73	2.48	70	2.43
55	1.89	47	2.06	40	2.04	38	1.94
36	1.98	32	1.91	18	1.52	15	1.32
13	1.15	11	1.05	10	.93	10	.82
4	.42	4	.33	3	.29	3	.31
3	.26	3	.27	3	.24	3	.18
3	.16	2	.18	2	.18	2	.15
1	.08	1	.07	.9	.07	.3	.03
.2	.04	.2	.05				

82

PARAMETER VALUES

PS : 3.20	ALPHA : .095	BETA : .0058
(3.01, 3.39)	(.090, .101)	(.0046, .0069)

FRACTION : <3 MICRON

SAMPLE TEMP 10.7°C INCUBATION TEMP 10.7°C

CHLOROPHYLL : .26 NITRATE : 2.37

CARBON : 84 NITROGEN : 9

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 04/06/1986 DEPTH 35 M

I	P	I	P	I	P	I	P
646	.02	566	.06	490	.13	419	.39
399	.69	343	1.17	195	1.75	163	1.94
140	1.98	124	1.73	116	2.03	110	1.87
66	1.79	55	1.82	47	1.94	43	1.67
36	1.51	34	1.45	25	1.49	21	1.36
18	1.24	17	1.24	16	1.12	14	.81
8	.68	6	.51	5	.50	5	.38
3	.35	3	.16	2	.15		

83

PARAMETER VALUES

PS : 3.57	ALPHA : .078	BETA : .0156
(3.13, 4.00)	(.073, .084)	(.0117, .0194)

FRACTION : WHOLE

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .23 NITRATE : 2.37

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 04/06/1986 DEPTH 35 M

I	P	I	P	I	P	I	P
526	.01	458	.02	379	.08	355	.26
343	.46	223	.72	195	1.05	179	1.07
151	1.33	132	1.11	78	1.18	69	1.27
61	1.25	55	1.21	52	1.21	49	.95
25	1.02	23	1.07	20	.92	19	.76
18	.63	8	.52	8	.44	7	.32
7	.37	7	.31	4	.21	3	.16
3	.11	3	.11	3	.09	2	.14
1	.04	1	.06	1	.02	.7	.01
.6	.03						

84

PARAMETER VALUES

PS : 3.12	ALPHA : .049	BETA : .0198
(2.29, 3.96)	(.046, .053)	(.0111, .0285)

FRACTION : > 1 MICRON

SAMPLE TEMP	10.5°C	INCUBATION TEMP	10.5°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.55	NITRATE :	2.37
---------------	-----	-----------	------

CARBON :	110	NITROGEN :	12
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 04/06/1986 DEPTH 35 M

I	P	I	P	I	P	I	P
698	.13	526	.24	458	.27	379	.25
355	.44	343	.75	223	1.15	195	.97
179	1.48	159	1.79	151	1.49	78	1.67
69	1.43	61	1.45	55	1.27	52	1.55
49	1.34	28	1.35	25	1.00	23	1.02
19	.95	18	.94	8	1.07	7	.47
4	.60	3	.69				

85

PARAMETER VALUES

PS : 2.78	ALPHA : .065	BETA : .0122
(2.13, 3.42)	(.056, .074)	(.0066, .0178)

FRACTION : < 1 MICRON

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : 1.05 NITRATE : 2.21

CARBON : 147 NITROGEN : 18

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 04/06/1986

DEPTH 35 M

I	P	I	P	I	P	I	P
458	.41	343	.73	299	.59	263	.94
255	.87	243	1.24	151	1.46	124	1.66
92	1.55	61	1.87	57	1.71	48	1.46
43	1.62	36	1.53	33	1.31	20	.86
18	1.01	16	1.30	15	.99	14	.74
12	.57	5	.28	5	.43	4	.40
4	.23	4	.28	3	.29	3	.14
3	.19	3	.20	3	.29	3	.23
2	.12	2	.03				

86

PARAMETER VALUES

PS : 2.63	ALPHA : .077	BETA : .0104
(2.37, 2.90)	(.072, .082)	(.0081, .0128)

FRACTION : > 3 MICRON

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .87 NITRATE : 2.21

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 04/06/1986 DEPTH 35 M

I	P	I	P	I	P	I	P
458	.13	343	.15	299	.32	263	.50
255	1.02	243	1.41	151	1.49	124	1.52
100	1.66	92	1.70	86	1.68	83	1.67
57	1.62	48	1.69	43	1.66	36	1.54
33	1.53	20	1.28	18	1.11	16	1.17
15	1.11	14	.85	12	.83	5	.39
5	.54	4	.38	4	.35	4	.36
3	.33	3	.29	3	.27	3	.24
3	.19	3	.23	2	.20	2	.11
1	.08	.9	.09	.3	.02	.3	.02
.3	.01						

PARAMETER VALUES

PS : 2.88	ALPHA : .090	BETA : .0149
(2.58, 3.17)	(.084, .096)	(.0116, .0181)

FRACTION : < 3 MICRON

SAMPLE TEMP 10.5°C INCUBATION TEMP 10.5°C

CHLOROPHYLL : .20 NITRATE : 2.21

CARBON : 83 NITROGEN : 9

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 05/06/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
690	2.80	566	3.05	498	3.61	474	4.11
439	4.02	395	4.22	191	4.18	163	4.45
151	3.93	140	3.86	128	3.44	116	3.45
64	3.23	52	3.14	45	2.75	40	2.46
36	1.76	34	1.75	25	1.78	21	1.48
19	1.22	17	1.09	16	.89	16	.82
8	.52	7	.44	6	.34	6	.23
5	.23	4	.22	3	.11	3	.10
2	.01						

88

PARAMETER VALUES

PS :	5.21	ALPHA :	.074	BETA :	.0039
(	4.79, 5.62 )	(	.070, .079 )	(	.0026, .0051)

FRACTION : WHOLE

SAMPLE TEMP 11.0°C INCUBATION TEMP 11.0°C

CHLOROPHYLL : .45 NITRATE : 2.21

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 05/06/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
710	2.31	562	3.61	470	3.63	415	3.82
183	3.84	163	3.19	159	3.25	148	2.84
132	3.17	79	3.13	70	3.15	62	2.19
57	2.77	52	2.03	46	2.14	28	1.74
25	1.87	23	1.50	22	1.02	21	.81
20	1.11	9	.70	8	.29	7	.81
7	.30	6	.17	5	.21	4	.27
3	.29	3	.18	3	.15		

68

PARAMETER VALUES

PS : 3.88	ALPHA : .070	BETA : .0013
(3.53, 4.23)	(.064, .076)	(.0004, .0023)

FRACTION : > 1 MICRON

SAMPLE TEMP	11.0°C	INCUBATION TEMP	11.0°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.68	NITRATE :	2.21
---------------	-----	-----------	------

CARBON :	98	NITROGEN :	11
----------	----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 05/06/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
710	2.64	562	3.35	470	3.19	439	2.37
415	3.04	359	3.14	227	3.58	183	3.40
148	3.88	132	3.70	79	3.56	70	3.76
62	3.39	57	3.23	52	3.13	46	2.78
28	2.67	25	2.27	23	1.68	22	1.56
21	1.32	20	1.36	9	.92	8	.97
7	.73	7	.41	6	.56	5	.15
4	.38	3	.25	3	.29	3	.30
3	.03	3	.00				

06

PARAMETER VALUES

PS :	4.25	ALPHA :	.110	BETA :	.0031
(	4.00, 4.49 )	(	.103, .118 )	(	.0023, .0039)

FRACTION : < 1 MICRON

SAMPLE TEMP	11.0°C	INCUBATION TEMP	11.0°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.51	NITRATE :	1.57
---------------	-----	-----------	------

CARBON :	262	NITROGEN :	28
----------	-----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 05/06/1986

DEPTH 15 M

I	P	I	P	I	P	I	P
482	5.21	411	5.86	295	5.94	279	6.64
271	6.27	159	5.70	136	6.34	124	4.91
105	5.27	100	5.20	96	5.10	73	5.40
63	5.71	57	5.11	51	3.81	47	3.09
42	4.42	22	1.69	20	2.05	17	1.47
16	1.38	16	.91	14	.87	5	.10
5	.15	4	.17	3	.01	3	.10

16

PARAMETER VALUES

PS : 7.38
(6.33, 8.43)ALPHA : .116
(.105, .127)BETA : .0046
(.0009, .0084)

FRACTION : >3 MICRON

SAMPLE TEMP

11.0°C

INCUBATION TEMP

11.0°C

CHLOROPHYLL : .31

NITRATE : 1.57

CARBON : -

NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 05/06/1986 DEPTH 15 M

I	P	I	P	I	P	I	P
482	3.18	411	3.24	347	3.30	295	3.22
279	3.17	271	3.71	159	3.45	136	3.66
124	3.72	105	3.57	100	3.29	96	3.13
73	2.99	63	2.79	57	2.88	51	2.42
47	2.38	42	2.14	22	1.61	20	1.41
17	1.19	16	1.01	16	.85	14	.77
5	.28	5	.29	4	.22	4	.19
4	.18	4	.09	4	.16	3	.06
3	.15	3	.04	3	.21	3	.14
2	.05	1	.01				

92

PARAMETER VALUES

PS :	4.28	ALPHA :	.077	BETA :	.0031
(	4.05, 4.51 )	(	.074, .081 )	(	.0022, .0040)

FRACTION : <3 MICRON

SAMPLE TEMP 11.0°C INCUBATION TEMP 11.0°C

CHLOROPHYLL : .14 NITRATE : 1.57

CARBON : 106 NITROGEN : 13

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 06/06/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
566	6.11	506	5.92	447	5.90	391	5.77
331	6.19	187	5.36	151	5.62	132	5.25
124	4.53	116	4.37	96	3.97	63	3.45
49	2.53	45	2.89	36	2.47	33	2.14
32	1.75	24	1.59	20	1.43	18	1.16
17	1.02	15	.82	14	.71	8	.41
7	.30	6	.21	5	.21	5	.22
4	.18	3	.06	3	.11	2	.09
2	.10	2	.05	2	.02	1	.03

93

PARAMETER VALUES

PS : 6.51	ALPHA : .073	BETA : .0011
(6.03, 7.00)	(.070, .076)	(-.0001, .0022)

FRACTION : WHOLE

SAMPLE TEMP 11.6°C INCUBATION TEMP 11.6°C

CHLOROPHYLL : .12 NITRATE : 1.57

CARBON : - NITROGEN : -

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 06/06/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
626	4.44	534	3.94	470	4.54	419	4.54
391	4.17	343	3.70	223	4.26	159	4.29
151	3.64	144	3.44	128	3.70	76	3.37
68	3.39	59	2.33	53	2.64	50	1.71
27	1.29	23	1.04	20	1.31	19	.86
15	.56	14	.71	9	.91	8	.36
7	.11	7	.08	5	.04		

94

PARAMETER VALUES

PS :	4.31	ALPHA :	.064	BETA :	.0001
(	3.87, 4.75 )	(	.058, .070)	(- .0009,	.0011)

FRACTION : > 1 MICRON

SAMPLE TEMP 11.6°C INCUBATION TEMP 11.6°C

CHLOROPHYLL : .36 NITRATE : 1.57

CARBON : 135 NITROGEN : 16

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 06/06/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
626	4.89	534	4.70	470	4.76	419	4.10
391	4.17	343	5.00	223	4.32	183	4.63
159	4.81	151	4.60	144	4.50	128	4.10
76	3.86	68	3.61	59	3.56	53	3.11
50	2.57	44	2.68	27	2.14	23	1.52
20	1.78	19	1.32	15	.99	14	.94
9	.54	8	.50	7	.32	7	.51
5	.10	5	.08	4	.15	3	.14
3	.05	3	.07				

56

PARAMETER VALUES

PS :	4.81	ALPHA :	.090	BETA :	.0004
(4.55 ,	5.06)	(.085 ,	.095)	(-.0003 ,	.0010)

FRACTION : < 1 MICRON

SAMPLE TEMP : 11.6°C INCUBATION TEMP : 11.6°C

CHLOROPHYLL : .34 NITRATE : .28

CARBON : 147 NITROGEN : 18

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 06/06/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
458	6.59	367	6.67	275	5.11	263	5.41
159	5.81	128	6.82	106	4.60	98	4.81
94	6.04	90	4.92	68	5.26	59	3.93
51	6.18	47	4.43	41	3.94	36	3.02
22	1.07	18	1.11	16	1.11	15	1.77
14	1.40	13	.83	5	.74	4	.37
4	.15	3	.33	3	.12	3	.45
3	.32	3	.24				

96

PARAMETER VALUES

PS :	6.13	ALPHA :	.131	BETA :	.0000
(	5.26, 7.00 )	(	.114, .149 )	(	-.0028, .0028)

FRACTION : >3 MICRON

SAMPLE TEMP	11.6°C	INCUBATION TEMP	11.6°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.21	NITRATE :	.28
---------------	-----	-----------	-----

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 06/06/1986 DEPTH 5 M

I	P	I	P	I	P	I	P
458	6.16	367	6.23	319	5.79	283	5.42
275	5.25	263	5.79	159	5.40	128	5.85
106	5.39	98	5.34	94	4.71	90	4.13
68	4.37	59	3.84	51	4.10	47	3.38
41	2.94	36	2.73	22	1.84	18	1.45
16	1.13	15	1.10	14	.83	13	.82
5	.26	4	.13	4	.14	4	.11
4	.02	3	.04	3	.01	3	.05
3	.04						

77

PARAMETER VALUES

PS : 6.01	ALPHA : .103	BETA : .0003
(5.45, 6.57)	(.096, .110)	(-.0014, .0020)

FRACTION : < 3 MICRON

SAMPLE TEMP	11.6°C	INCUBATION TEMP	11.6°C
-------------	--------	-----------------	--------

CHLOROPHYLL :	.11	NITRATE :	.28
---------------	-----	-----------	-----

CARBON :	95	NITROGEN :	11
----------	----	------------	----

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 07/06/1986 DEPTH 50 M

I	P	I	P	I	P	I	P
367	.42	319	.48	283	.61	275	.71
263	.76	159	.96	128	.98	106	.92
98	1.03	94	1.21	90	1.38	68	1.23
59	1.31	47	1.16	41	1.08	22	1.12
18	1.05	15	.47	13	.34	5	.24
4	.26	4	.42	4	.11	4	.29
3	.11	3	.14	3	.32	3	.14
3	.01	3	.11				

98

PARAMETER VALUES

PS :	1.67	ALPHA :	.064	BETA :	.0059
(	1.50, 1.84 )	(	.057, .072 )	(	.0044, .0075)

SAMPLE TEMP	8.9°C	INCUBATION TEMP	8.9°C
-------------	-------	-----------------	-------

CHLOROPHYLL :	.10	NITRATE :	.28
---------------	-----	-----------	-----

CARBON :	-	NITROGEN :	-
----------	---	------------	---

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 07/06/1986 DEPTH 60 M

I	P	I	P	I	P	I	P
690	.14	566	.88	506	.94	447	.79
391	.85	331	1.03	187	1.50	151	1.52
132	1.39	124	1.49	116	1.54	96	1.12
49	1.20	45	1.35	36	1.31	33	1.19
32	1.34	24	.61	20	.81	18	.60
17	.69	15	.68	14	.65	8	.94
6	.75	5	.47	5	.02		

66

PARAMETER VALUES

PS : 1.83 ALPHA : .060 BETA : .0033
(1.63, 2.04) (.053, .068) (.0022, .0043)

SAMPLE TEMP 8.9°C INCUBATION TEMP 8.9°C

CHLOROPHYLL : .20 NITRATE : .28

CARBON : 100 NITROGEN : 14

CHARLES DARWIN 1986

LAT 50°30' N LONG 7° 0' W DATE 07/06/1986 DEPTH 80 M

	P	I	P	I	P	I	P
534	1.10	470	1.20	419	1.01	391	1.26
343	1.07	223	1.74	183	1.68	159	1.70
151	1.80	144	1.83	128	1.96	59	2.15
53	1.99	50	2.14	44	1.76	27	1.39
23	1.65	20	1.72	19	1.82	15	1.41
14	1.06	9	1.58	8	.94	7	.67
7	.60	5	.43	5	.63	4	.46
3	.26	2	.34	1	.11	1	.02
.7	.27						

100

PARAMETER VALUES

PS :	2.27	ALPHA :	.143	BETA :	.0036
(	2.14, 2.39 )	(	.131, .155 )	(	.0028, .0043)

SAMPLE TEMP 8.9°C INCUBATION TEMP 8.9°C

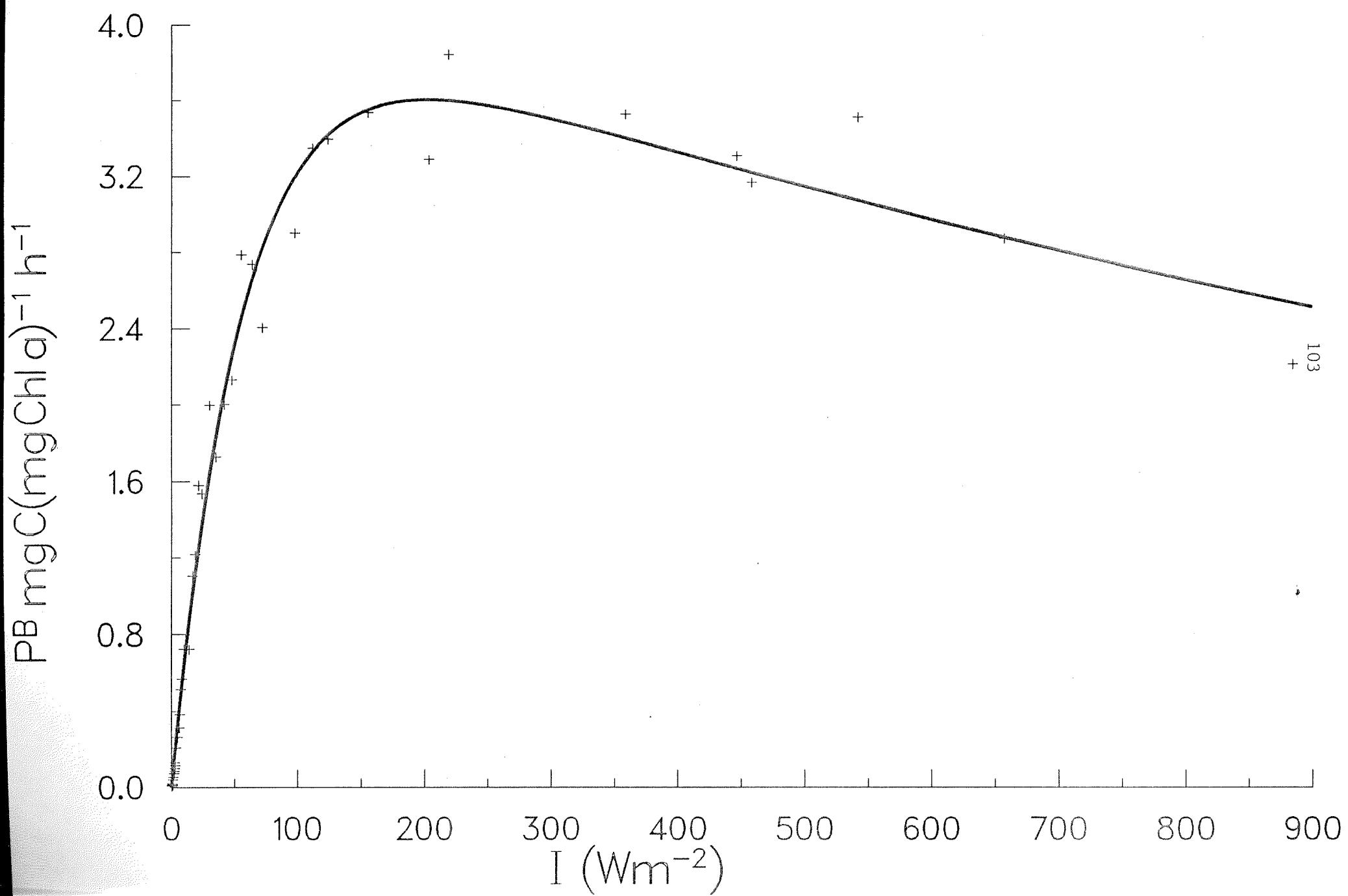
CHLOROPHYLL : .25 NITRATE : 4.05

CARBON : 106 NITROGEN : 12

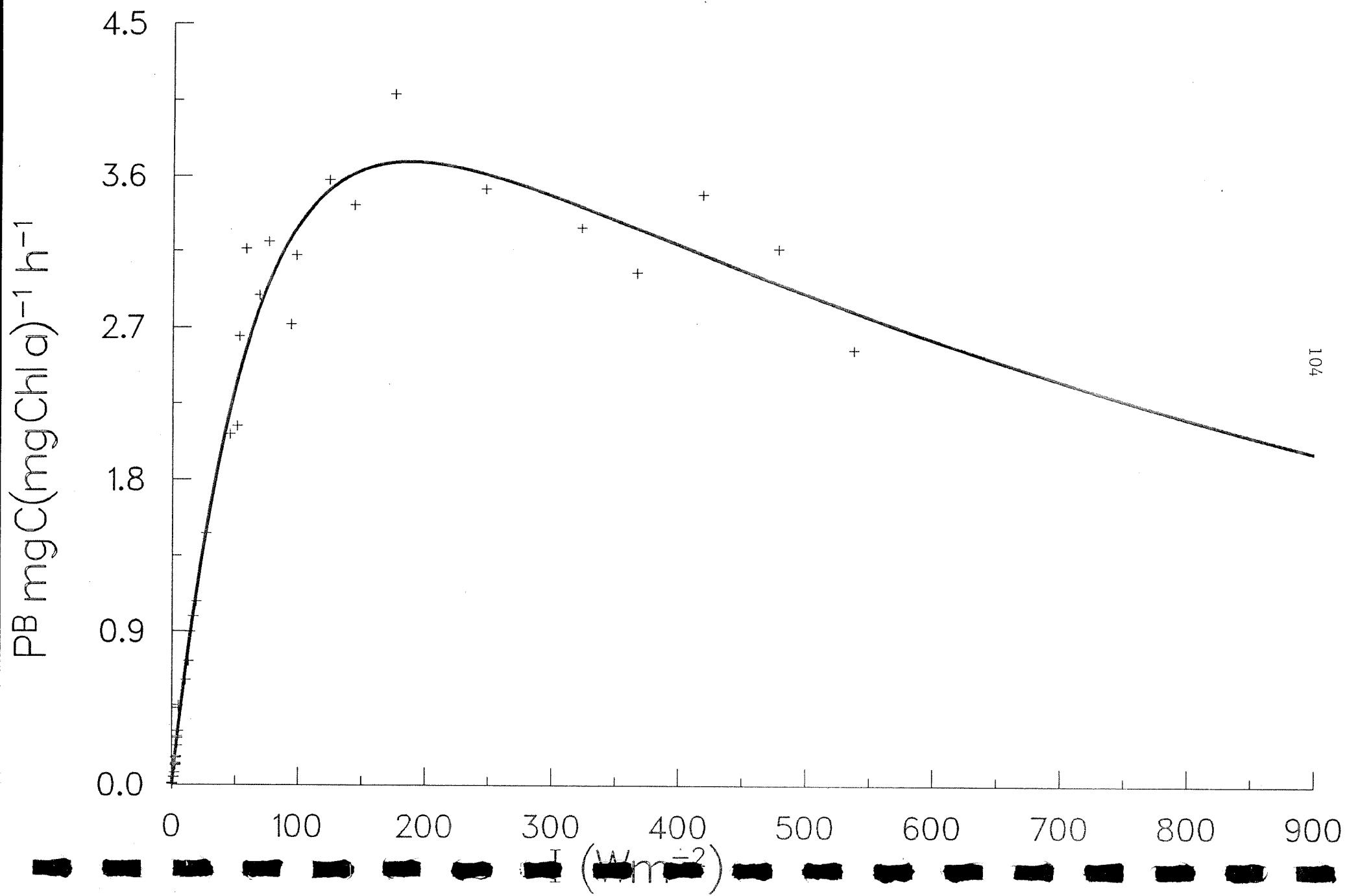
PI PLOTS



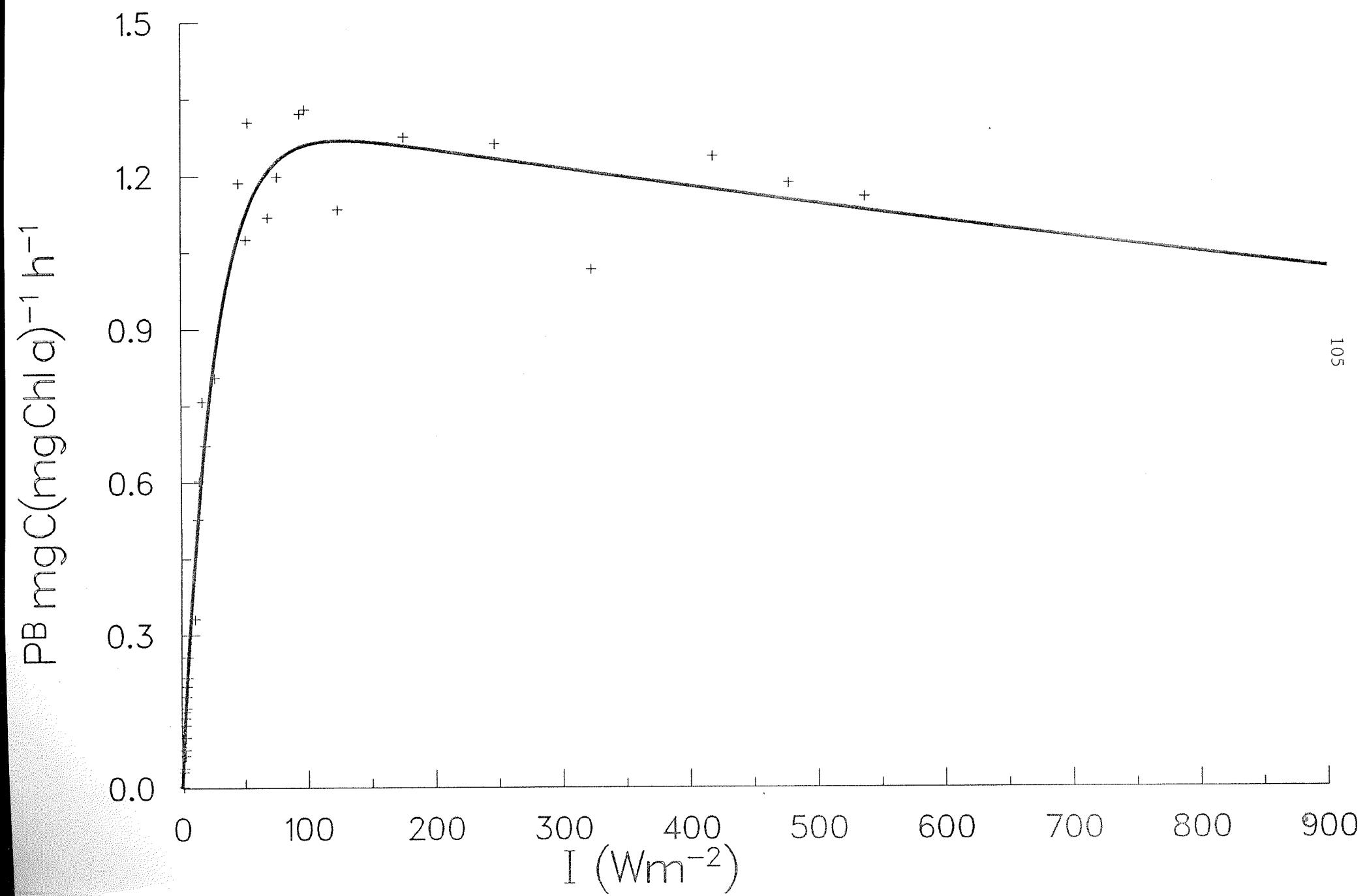
ID 016109W STA. 2 18/05/86 10 M



ID 016110>1 STA. 2 18/05/86 10 M

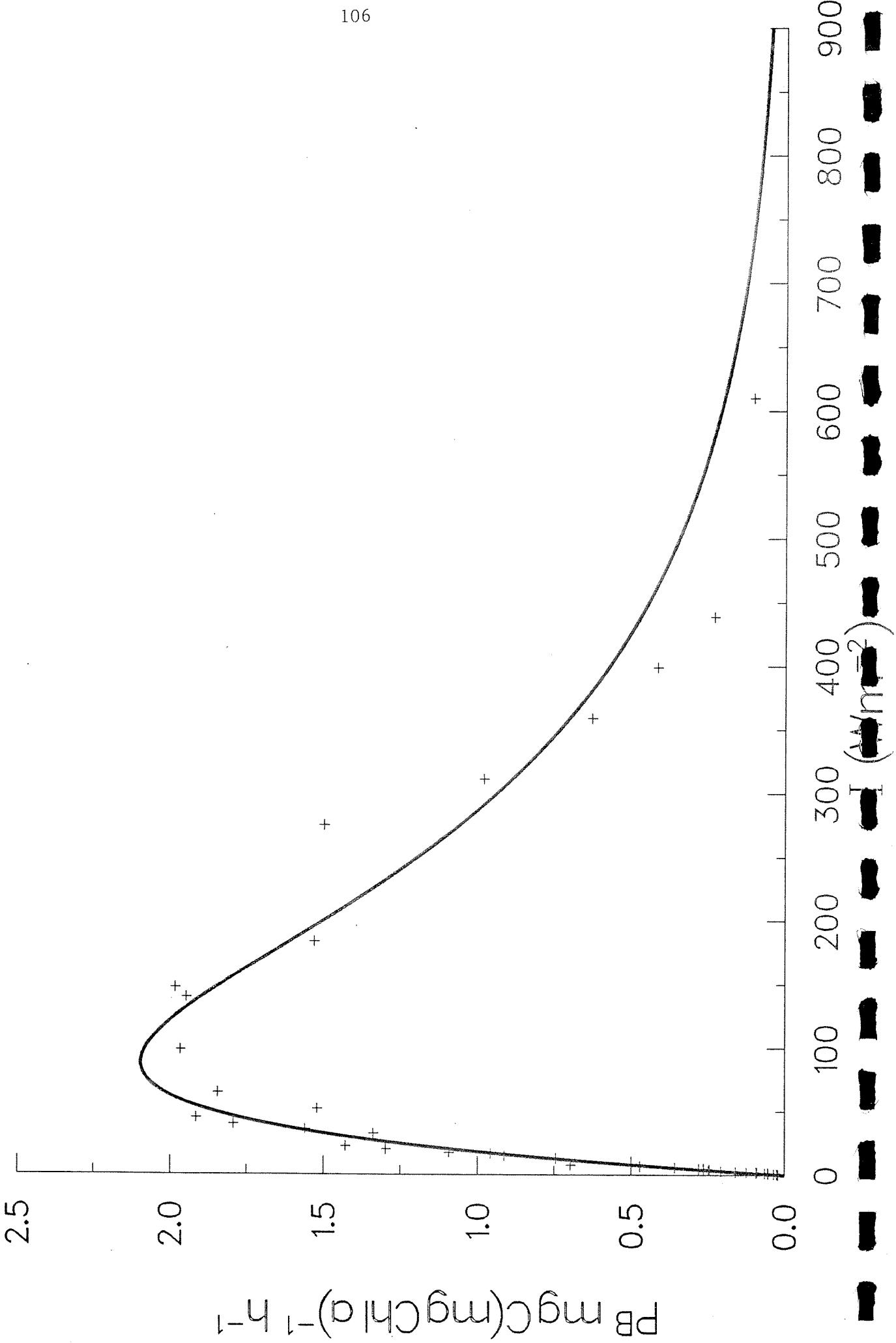


ID 01611<1 STA. 2 18/05/86 10 M



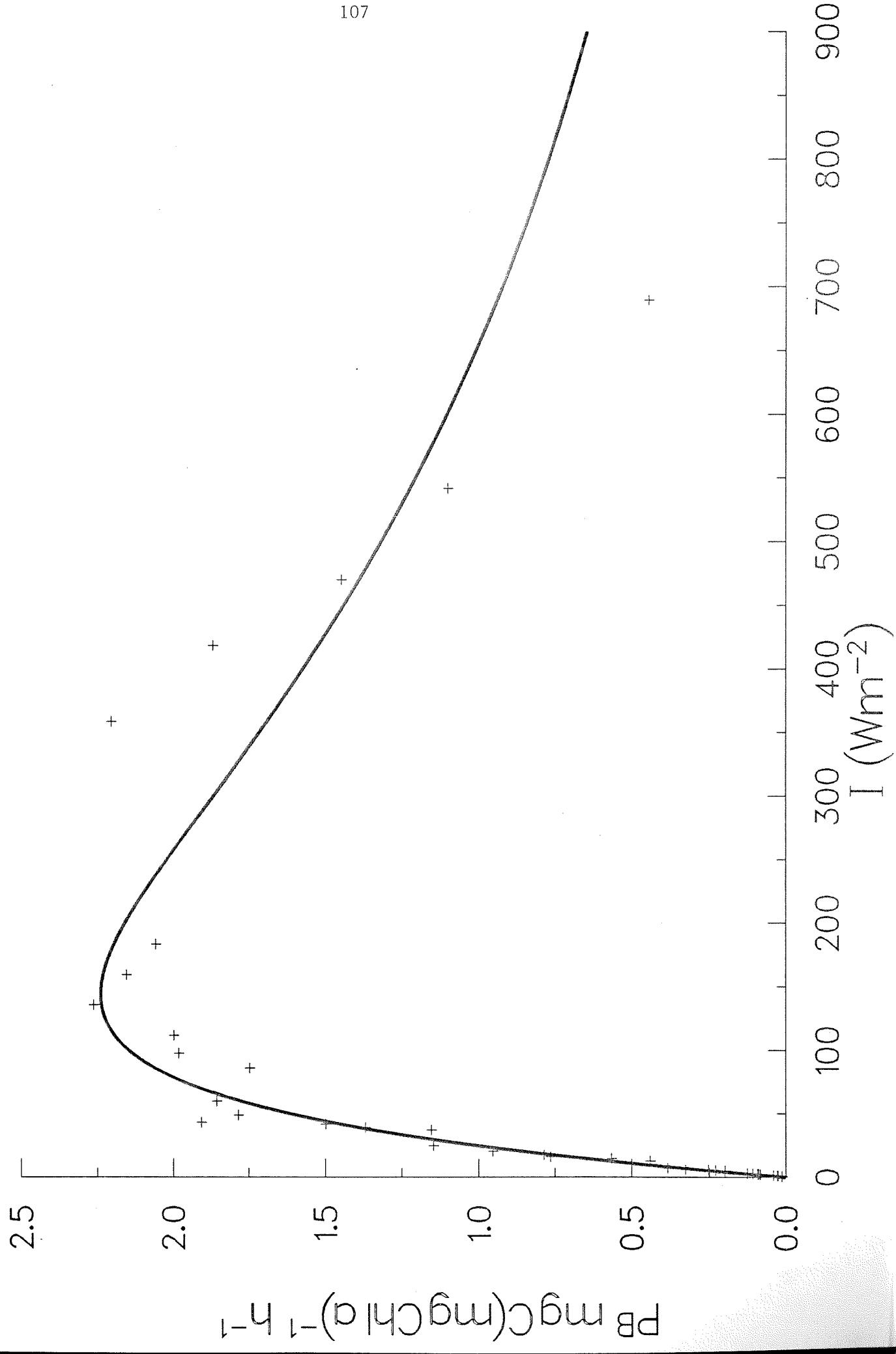
ID 016128W STA. 2 19/05/86 30 M

106



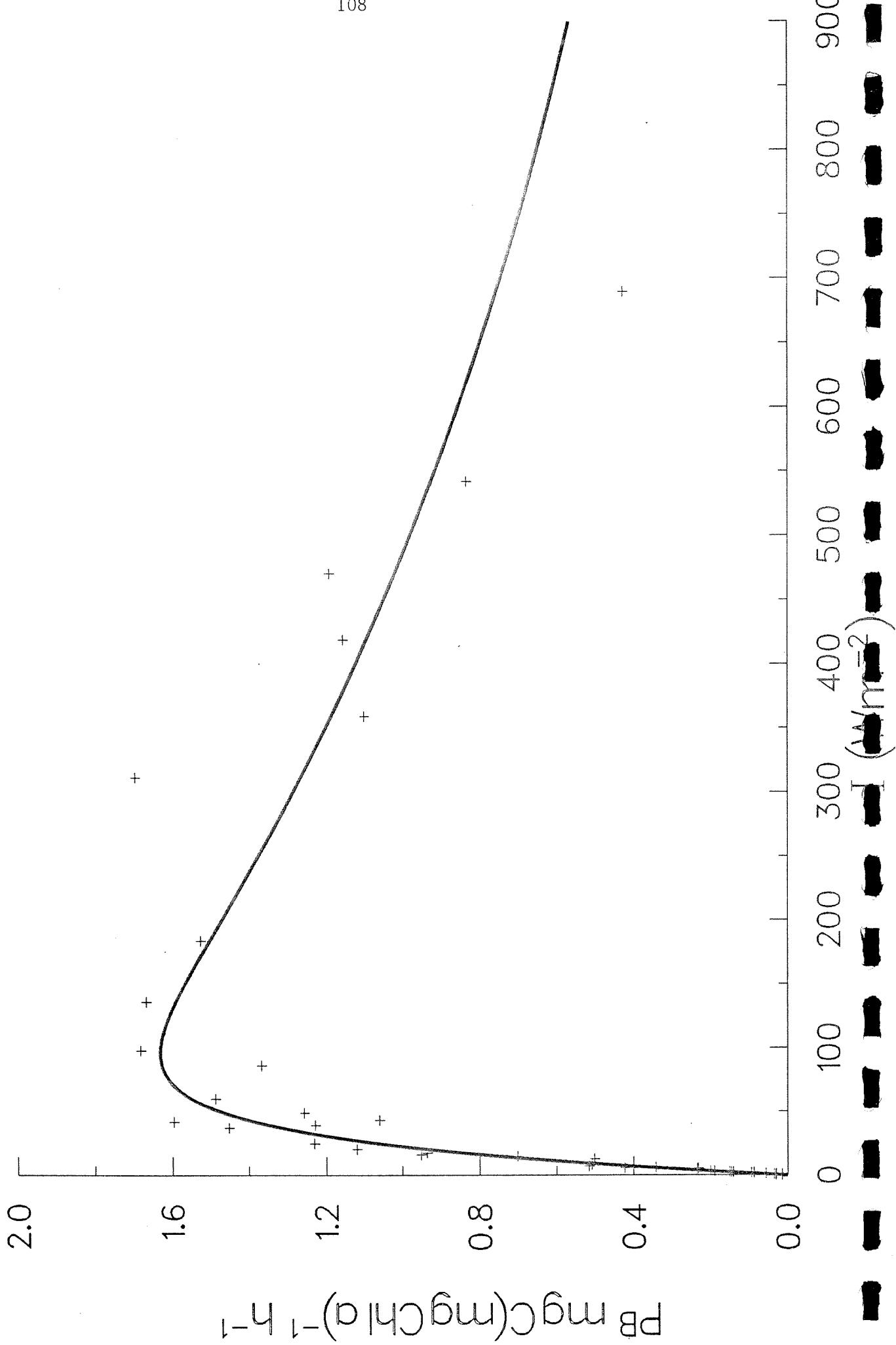
ID 016129>1 STA. 2 19/05/86 30 M

107

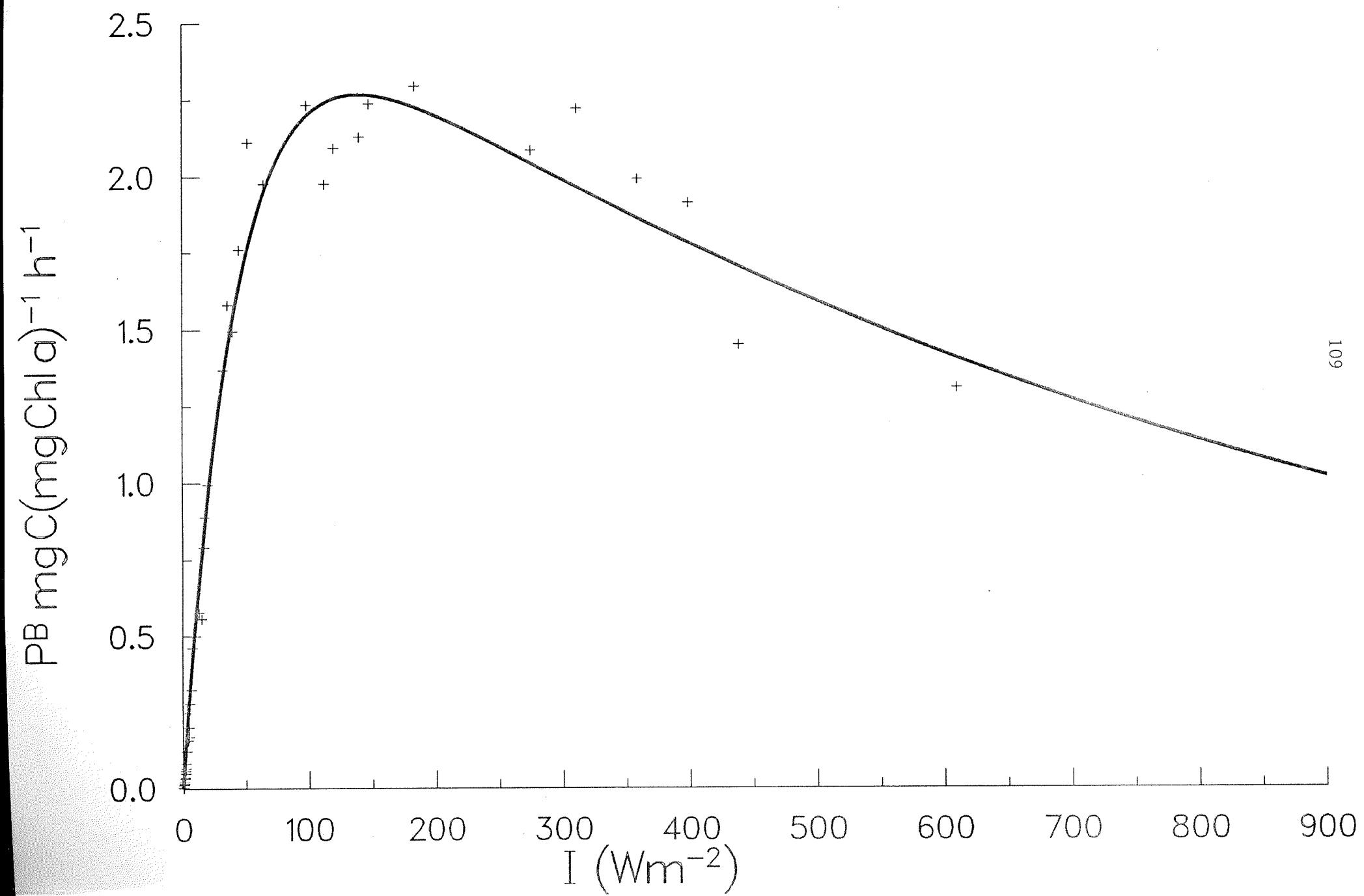


ID 016130<1 STA. 2 19/05/86 30 M

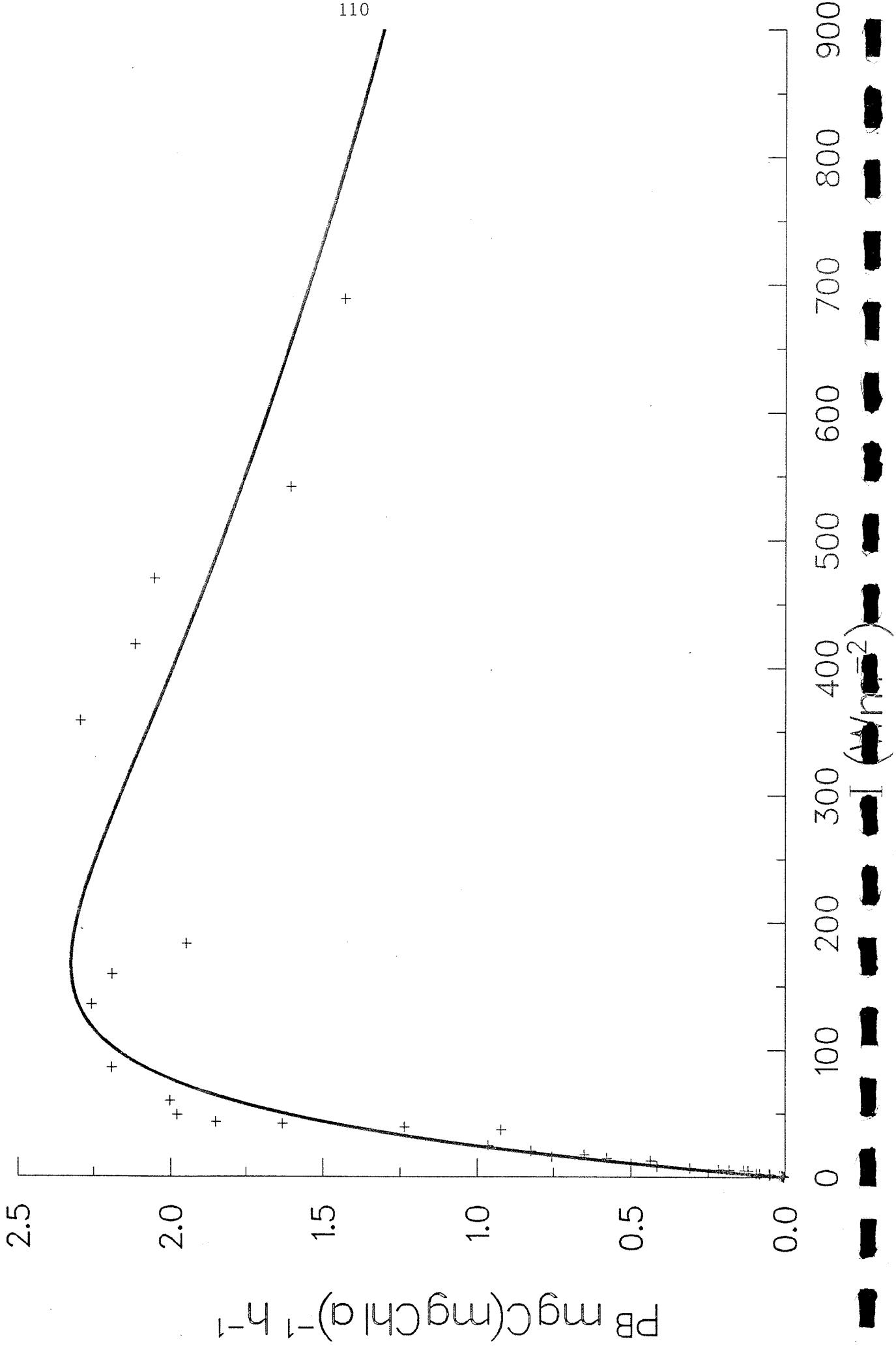
108



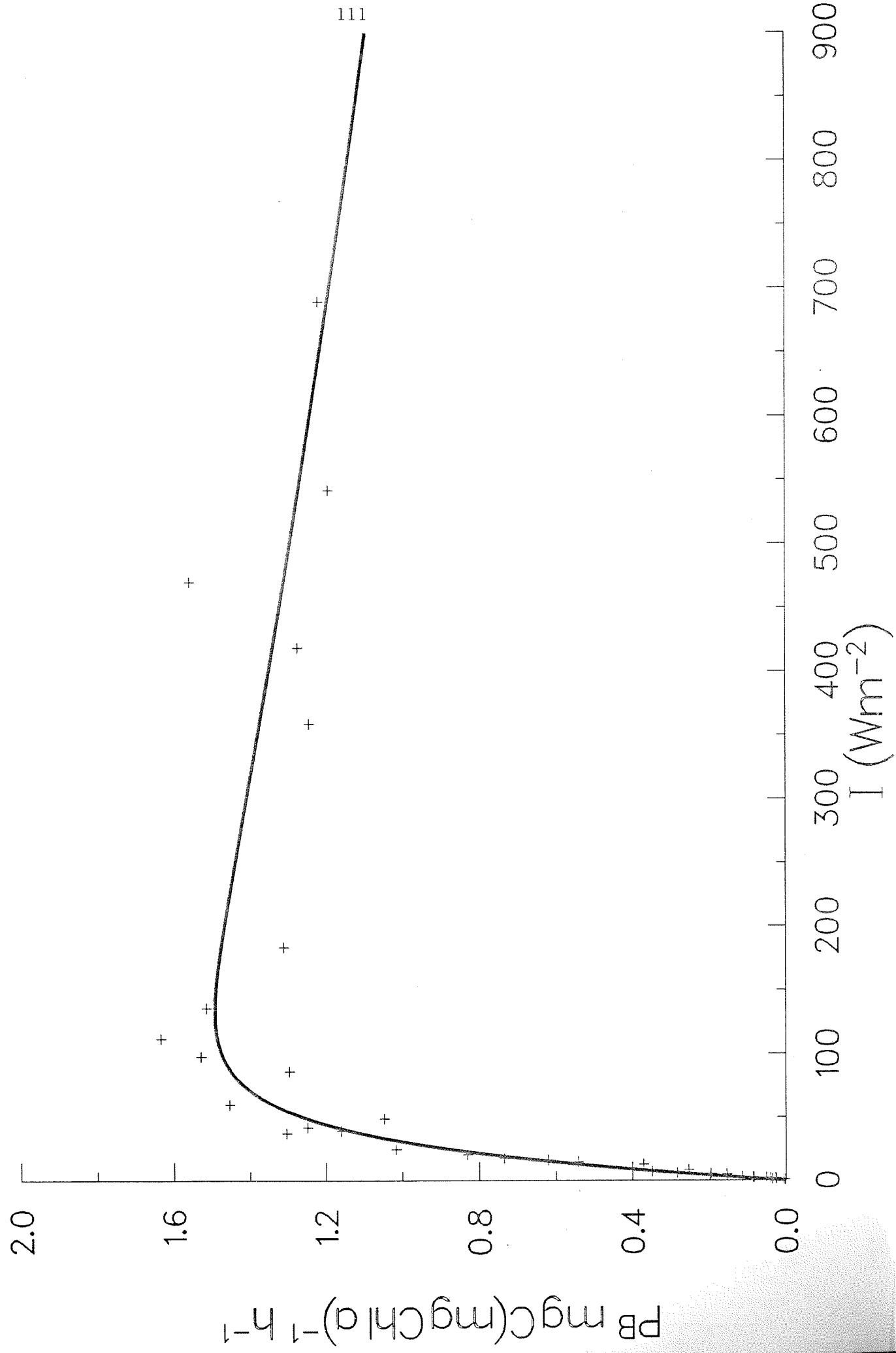
ID 016154W STA. 2 20/05/86 15 M



ID 016155>1 STA. 2 20/05/86 15 M

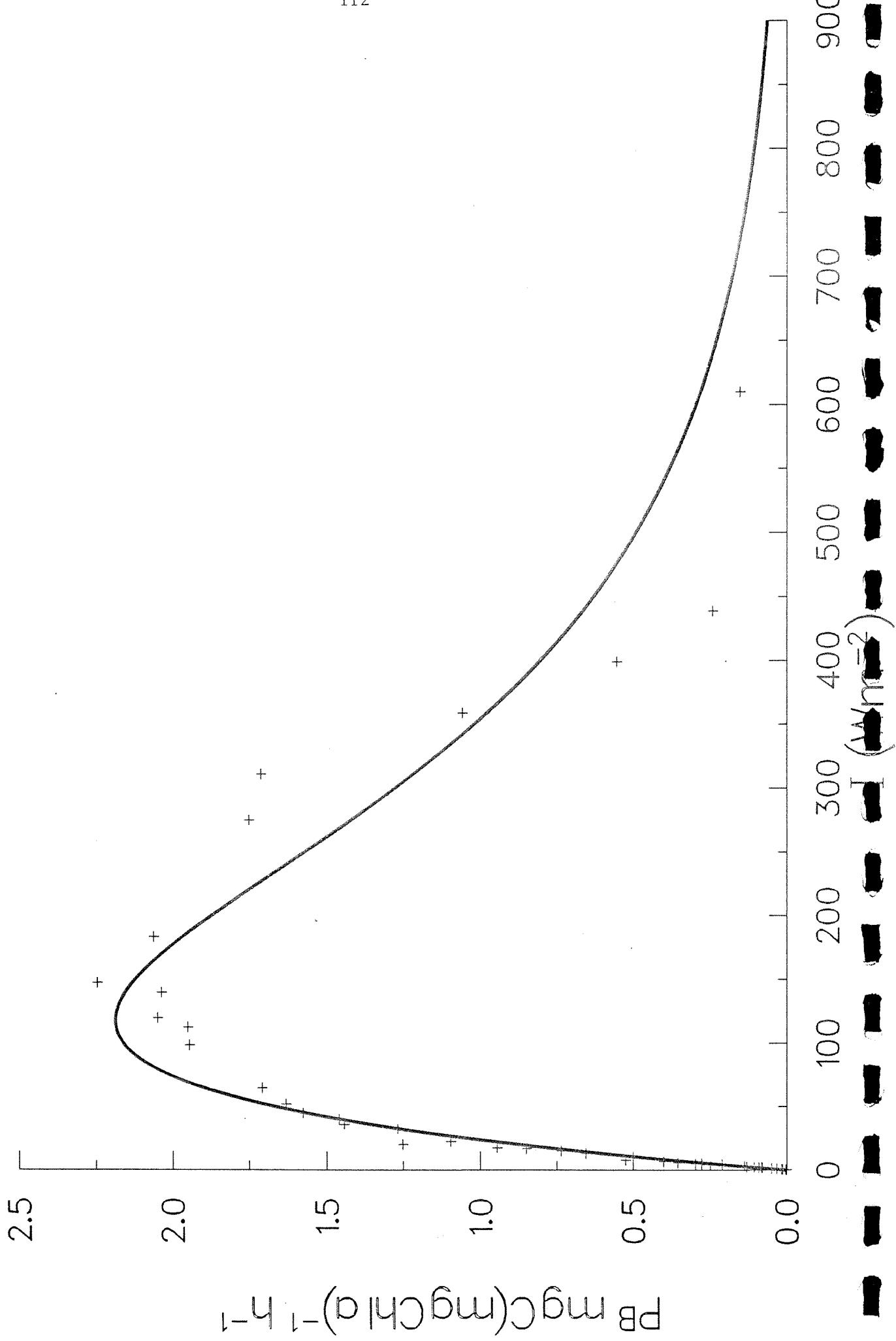


ID 016156<1 STA. 2 20/05/86 15 M

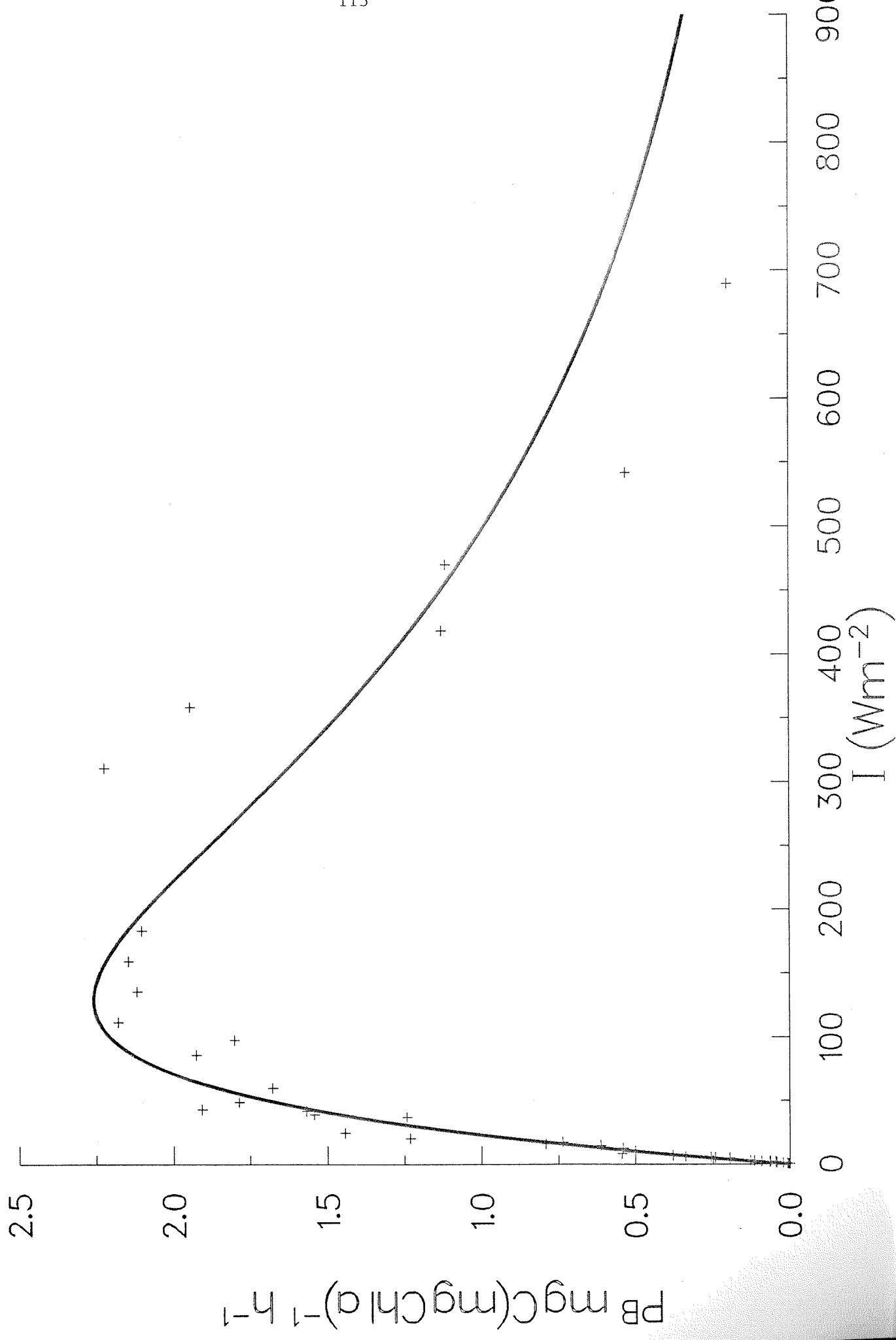


ID 016157W STA. 2 20/05/86 20 M

112

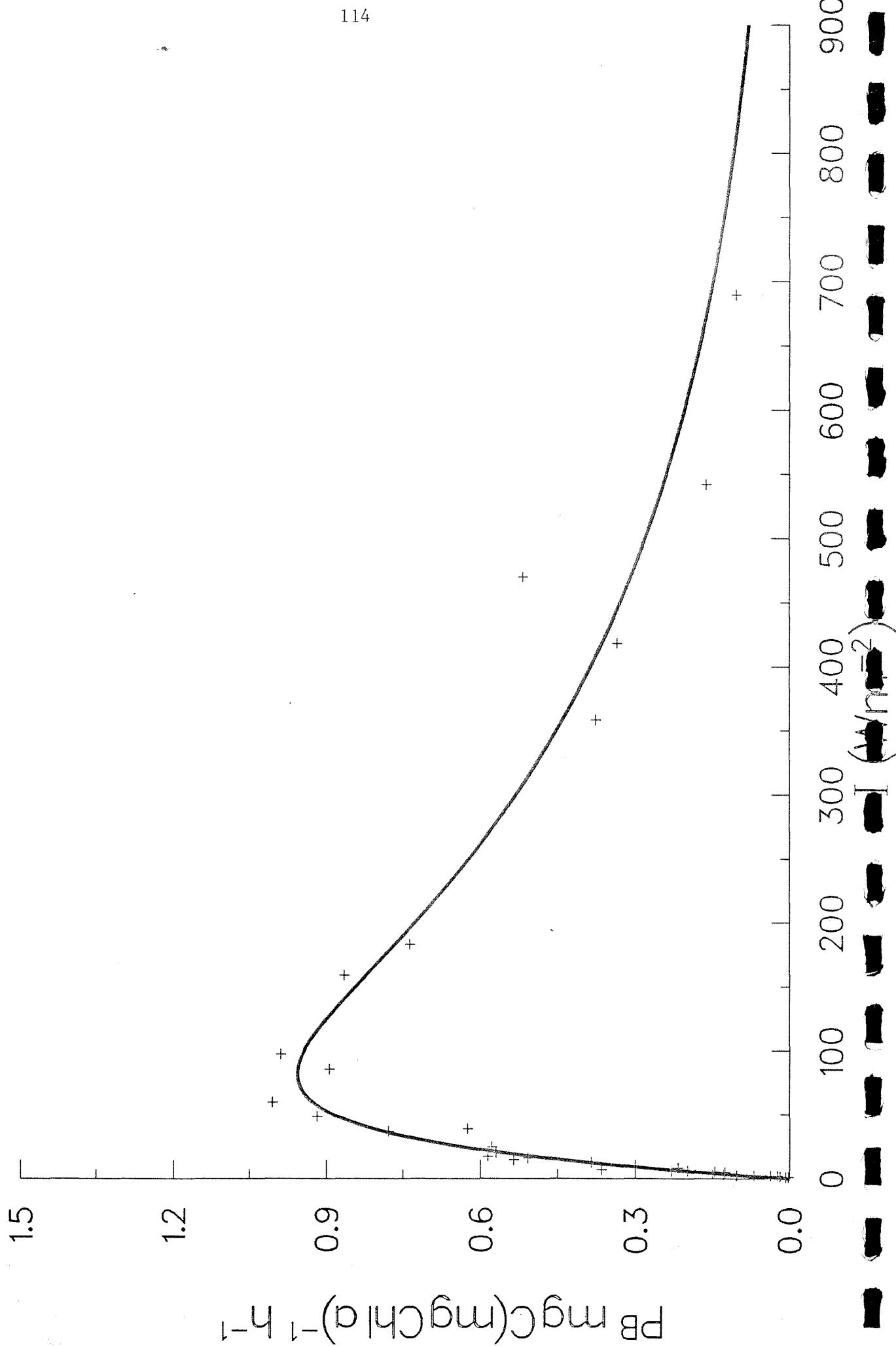


ID 016158>1 STA. 2 20/05/86 20 M

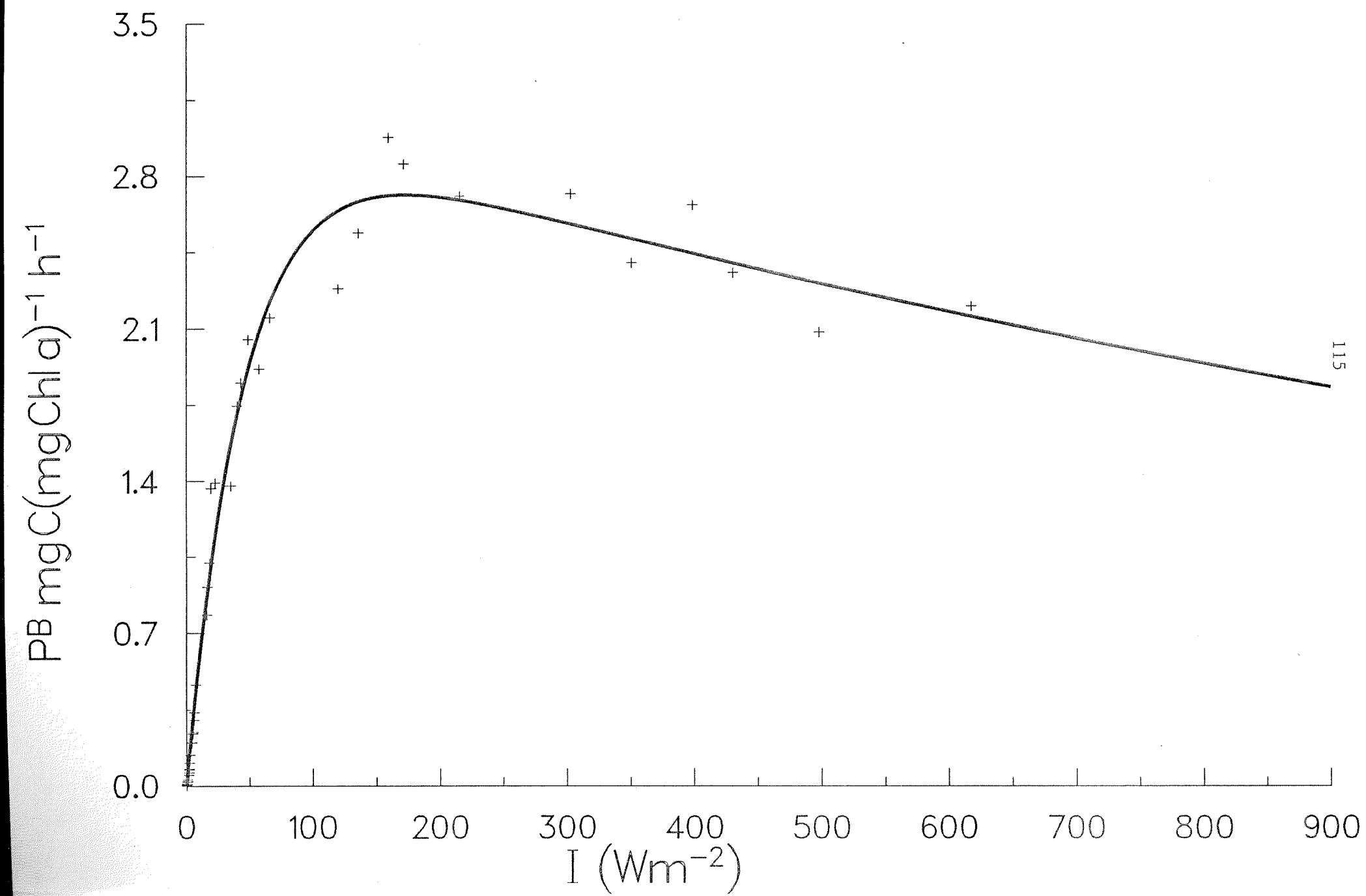


ID 016159<1 STA. 2 20/05/86 20 M

114

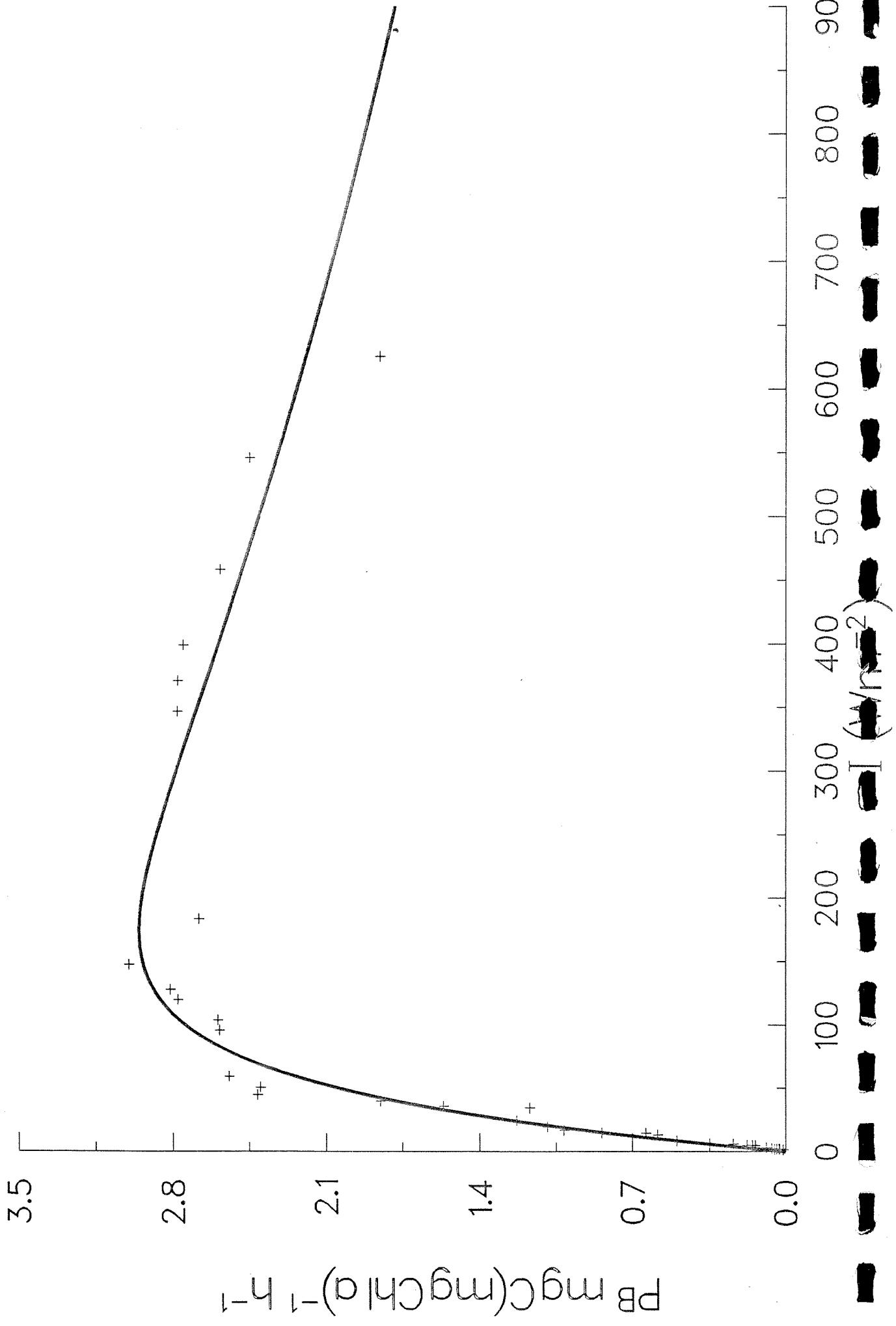


ID 016166W STA. 2 21/05/86 5 M



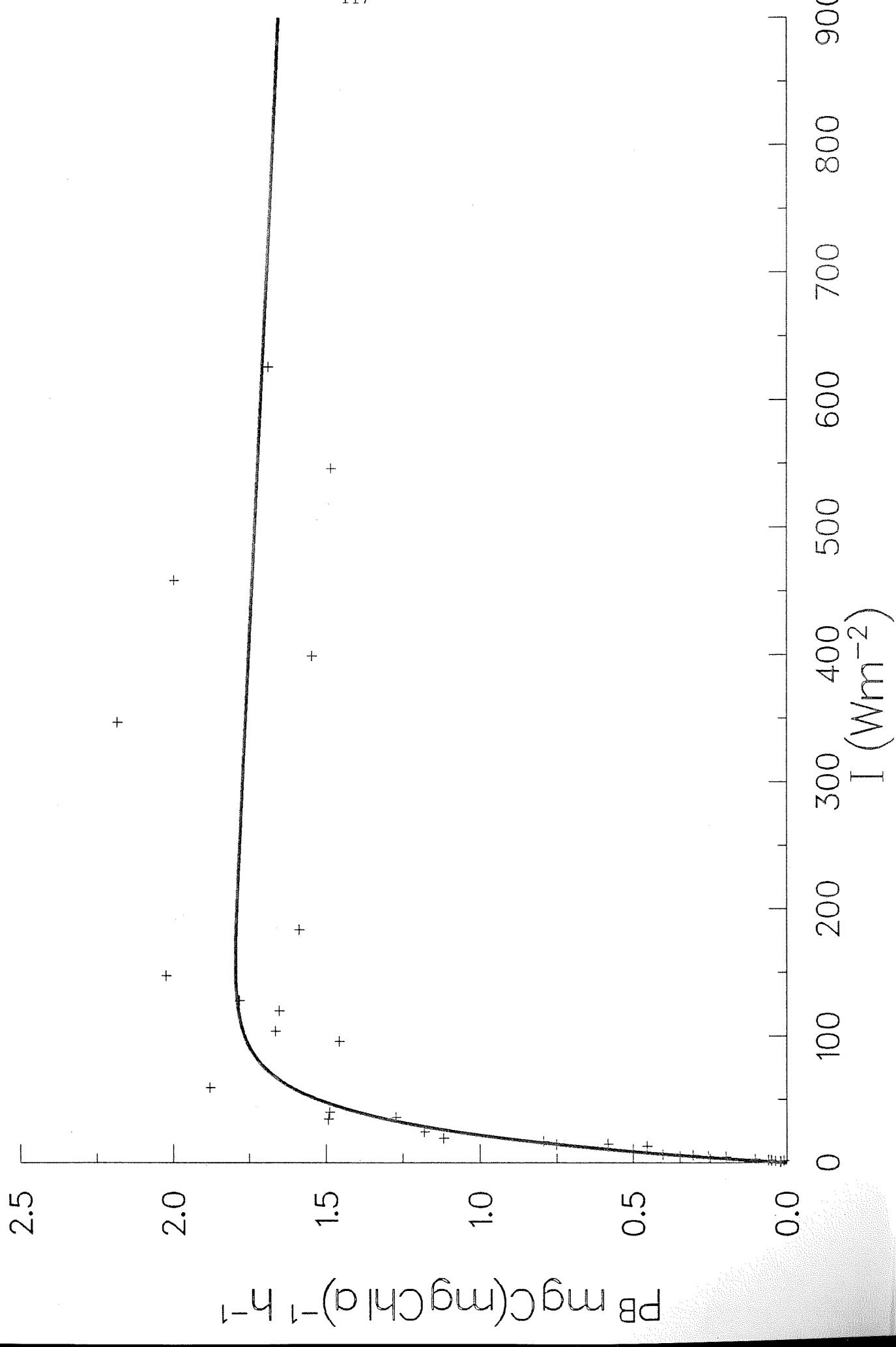
ID 016167>1 STA. 2 21/05/86 5 M

116



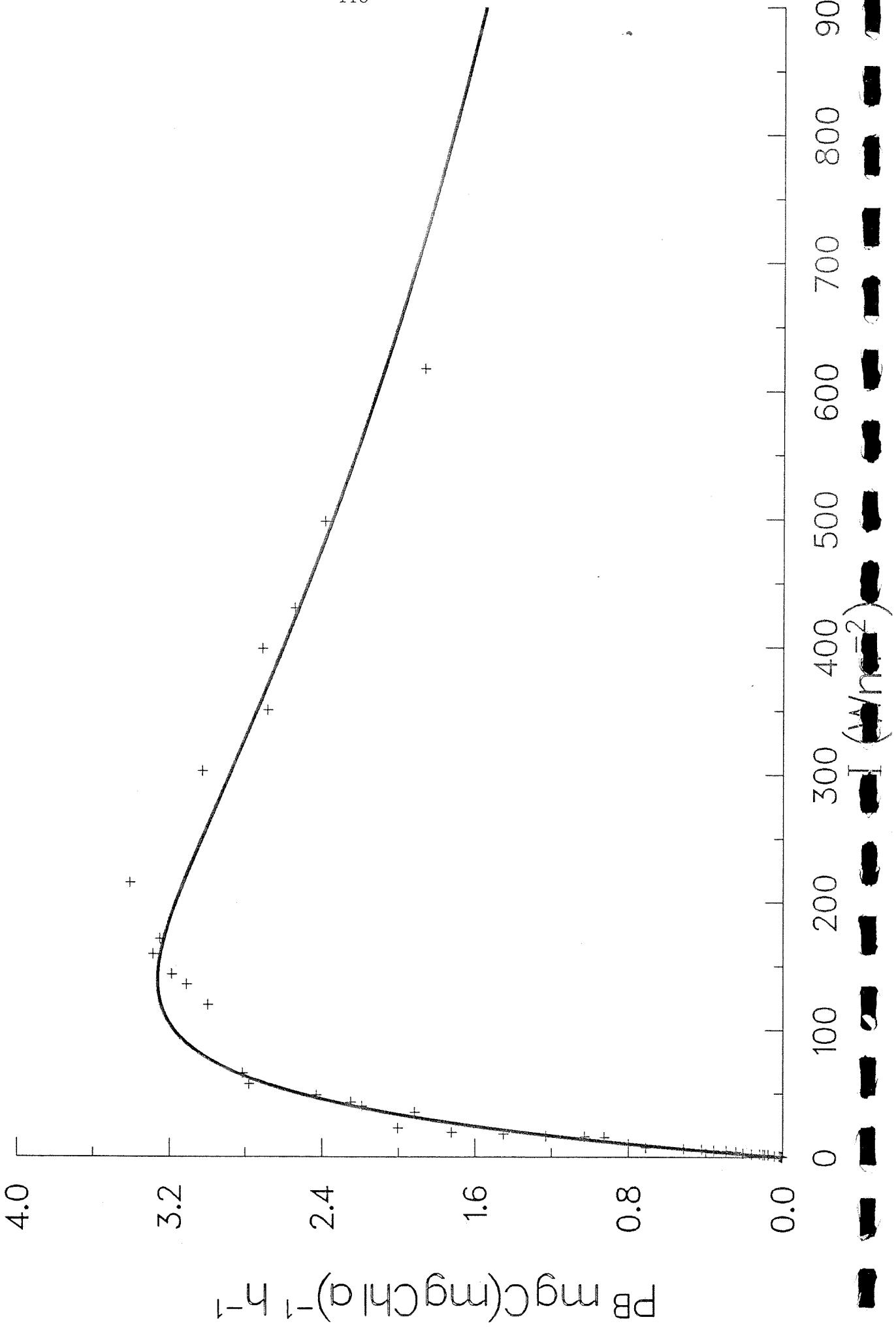
ID 016168<1 STA. 2 21/05/86 5 M

117

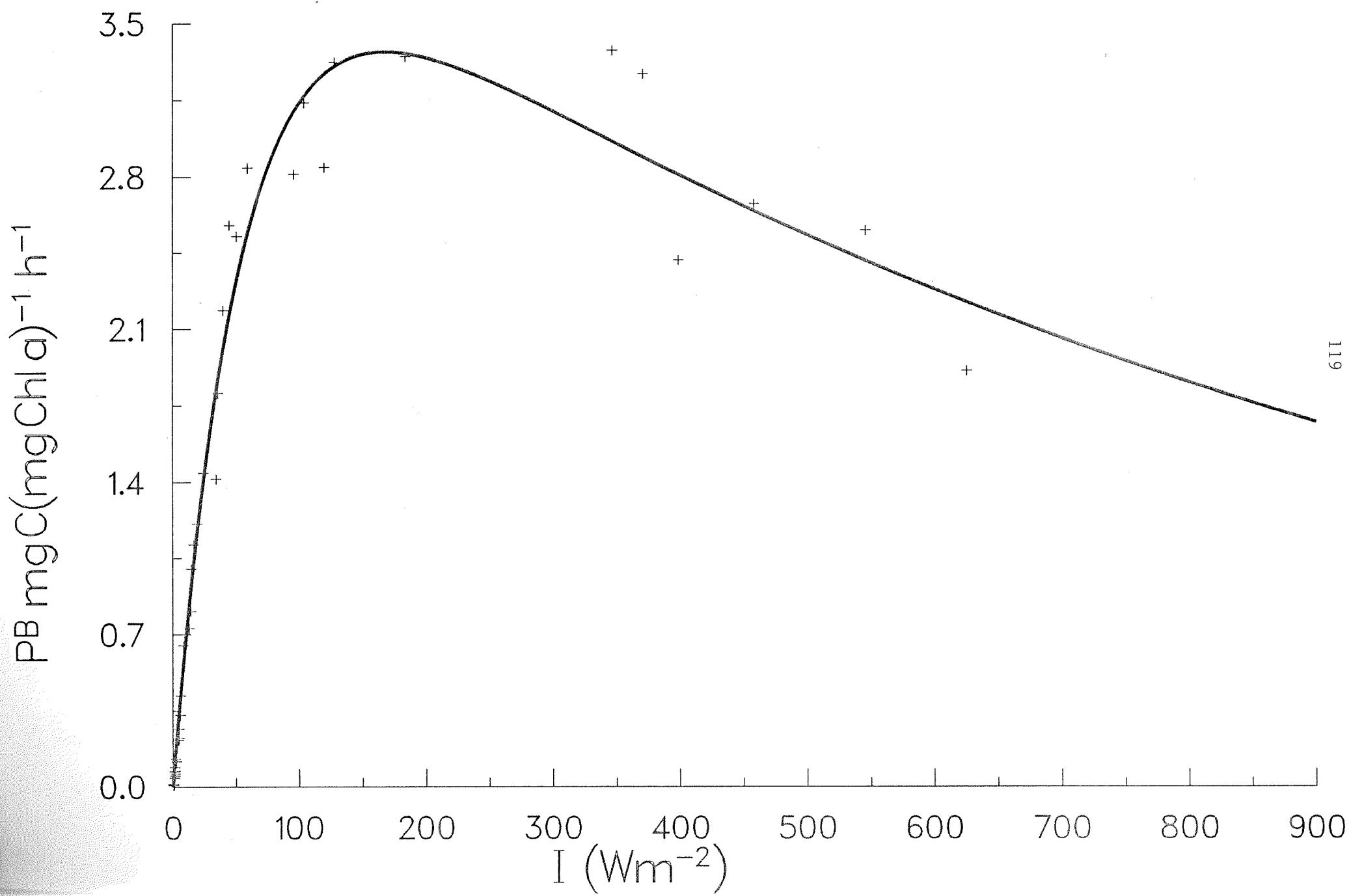


ID 016169W STA. 2 21/05/86 25 M

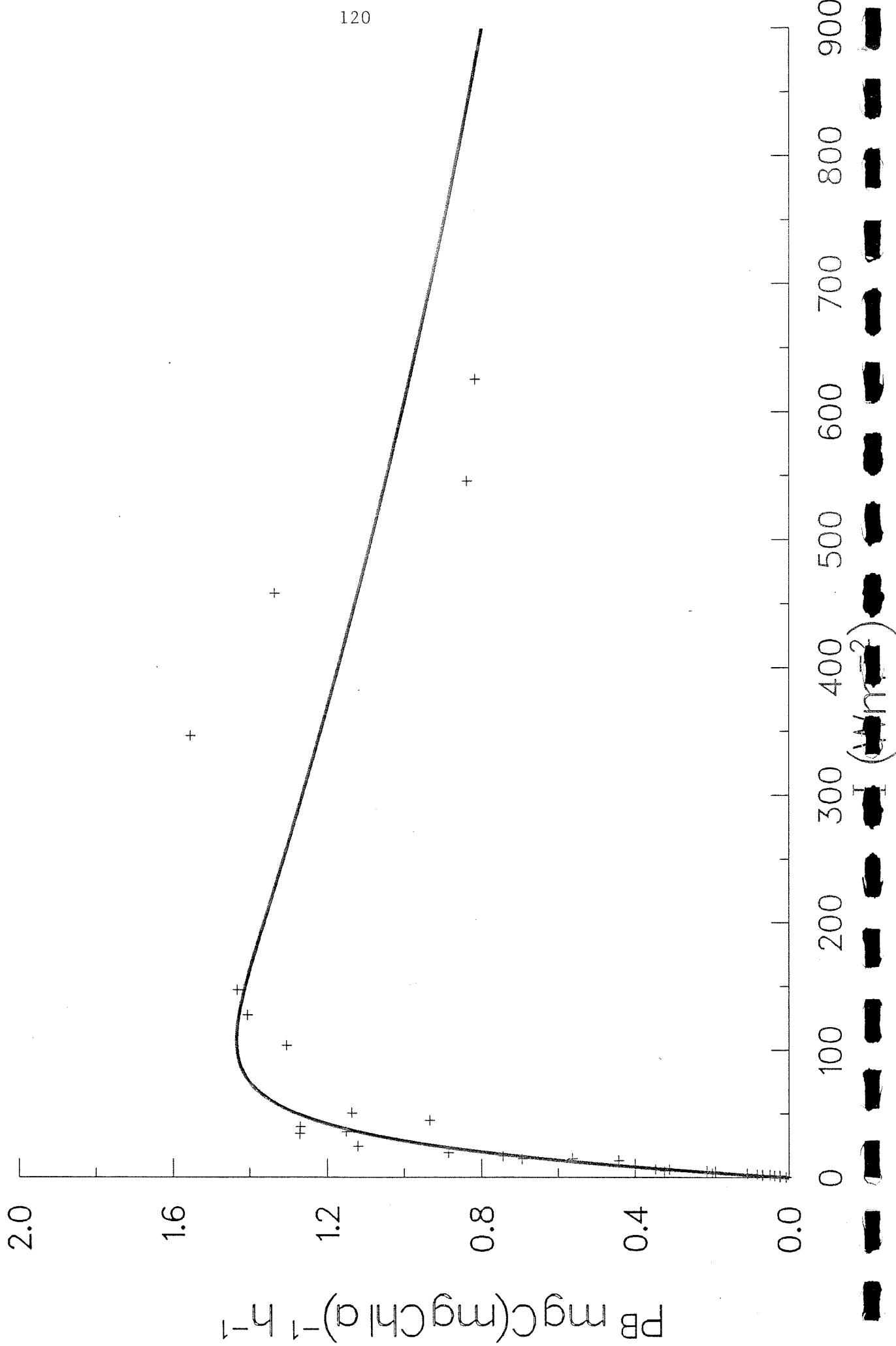
118



ID 016170>1 STA. 2 21/05/86 25 M

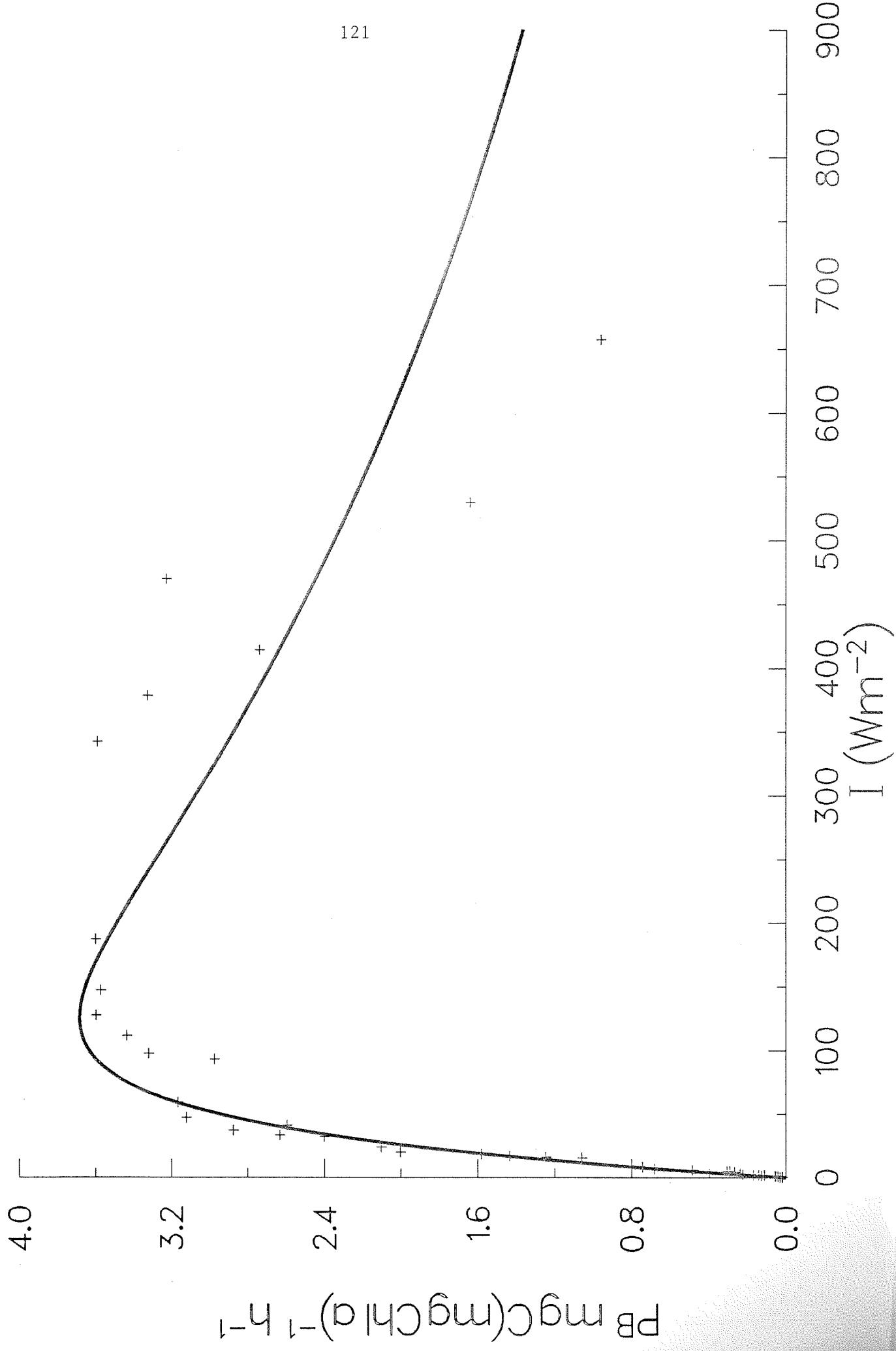


ID 016171<1 STA. 2 21/05/86 25 M



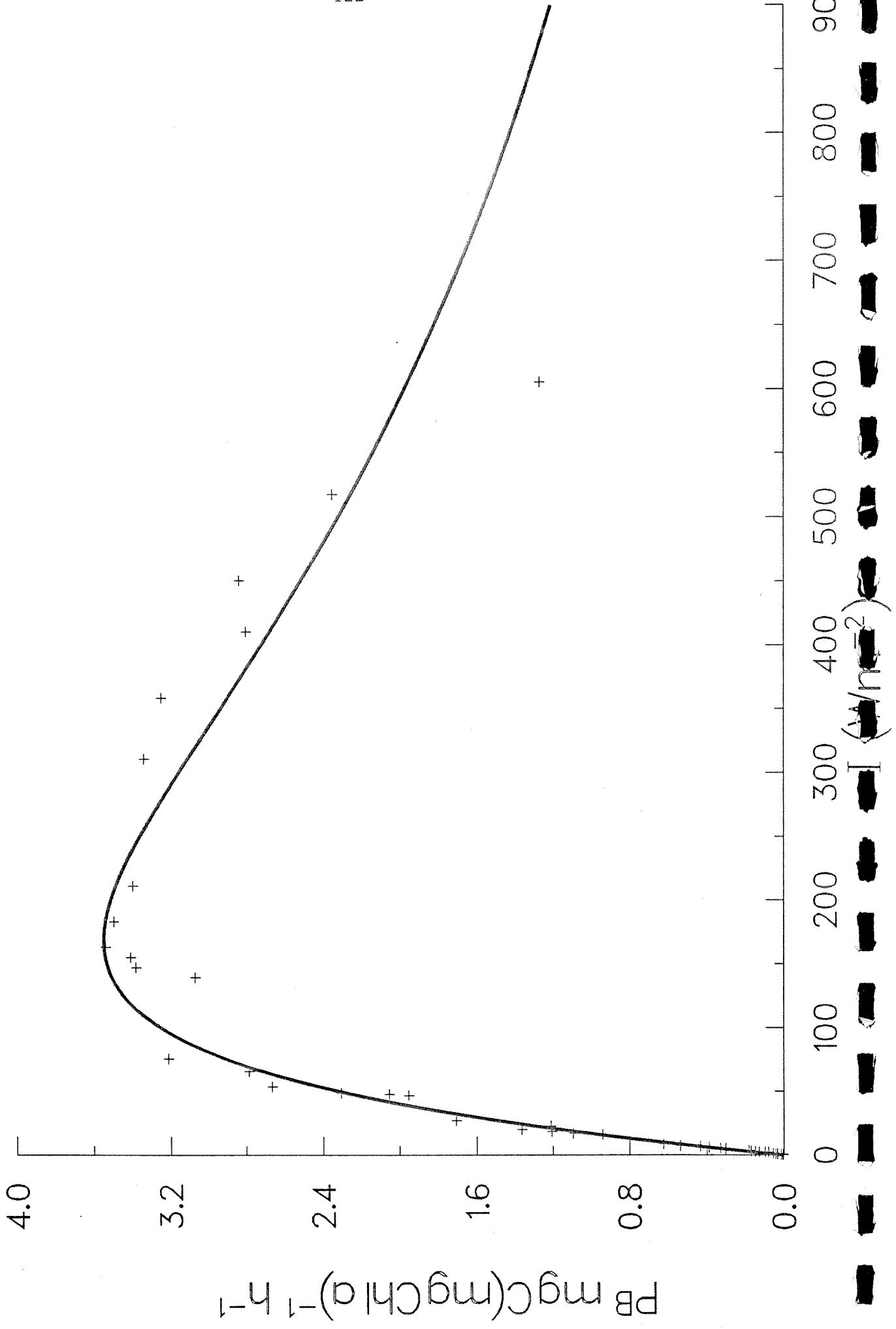
ID 016186W STA. 2 23/05/86 30 M

121

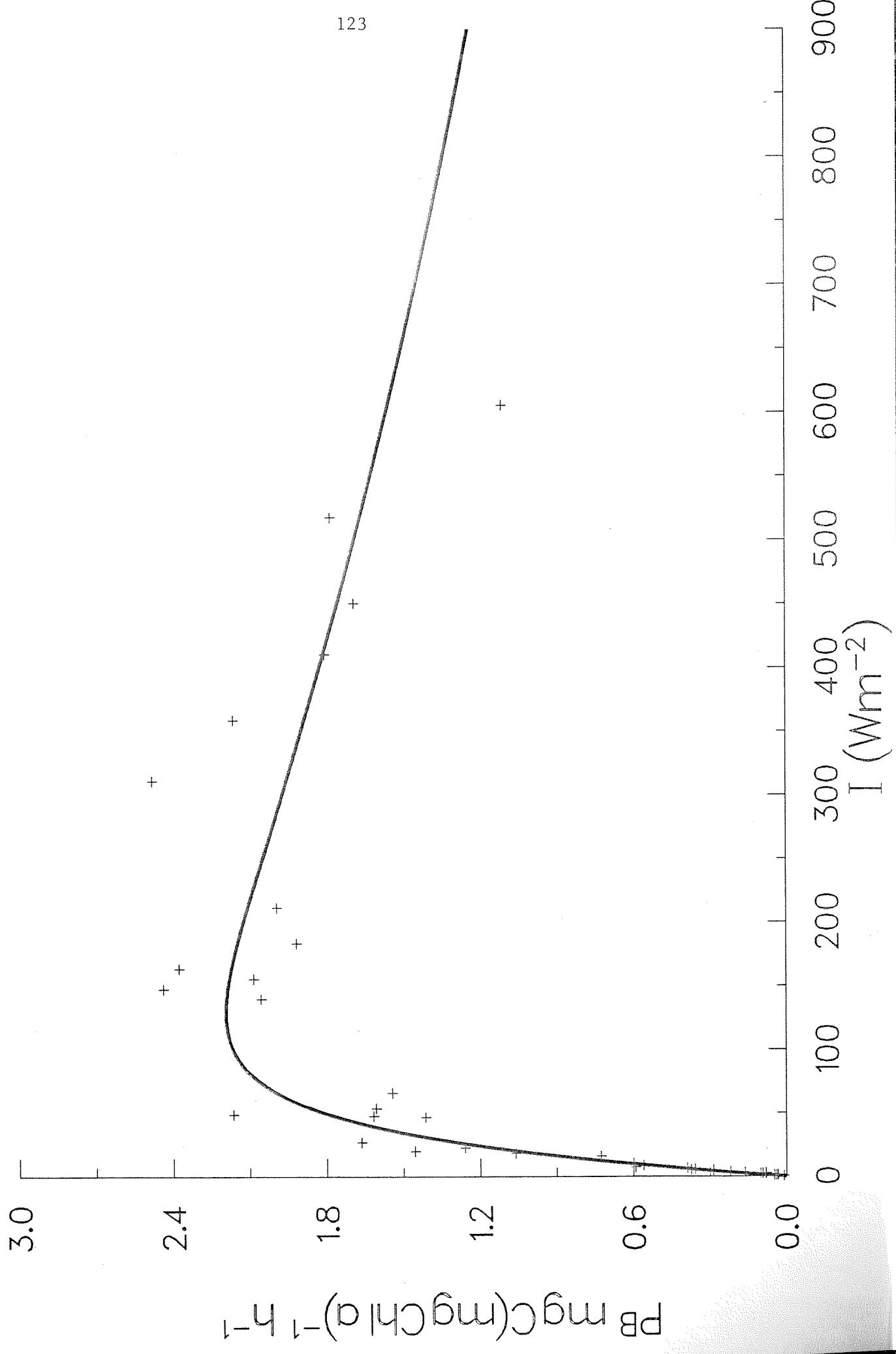


ID 016187>1 STA. 2 23/05/86 30 M

122

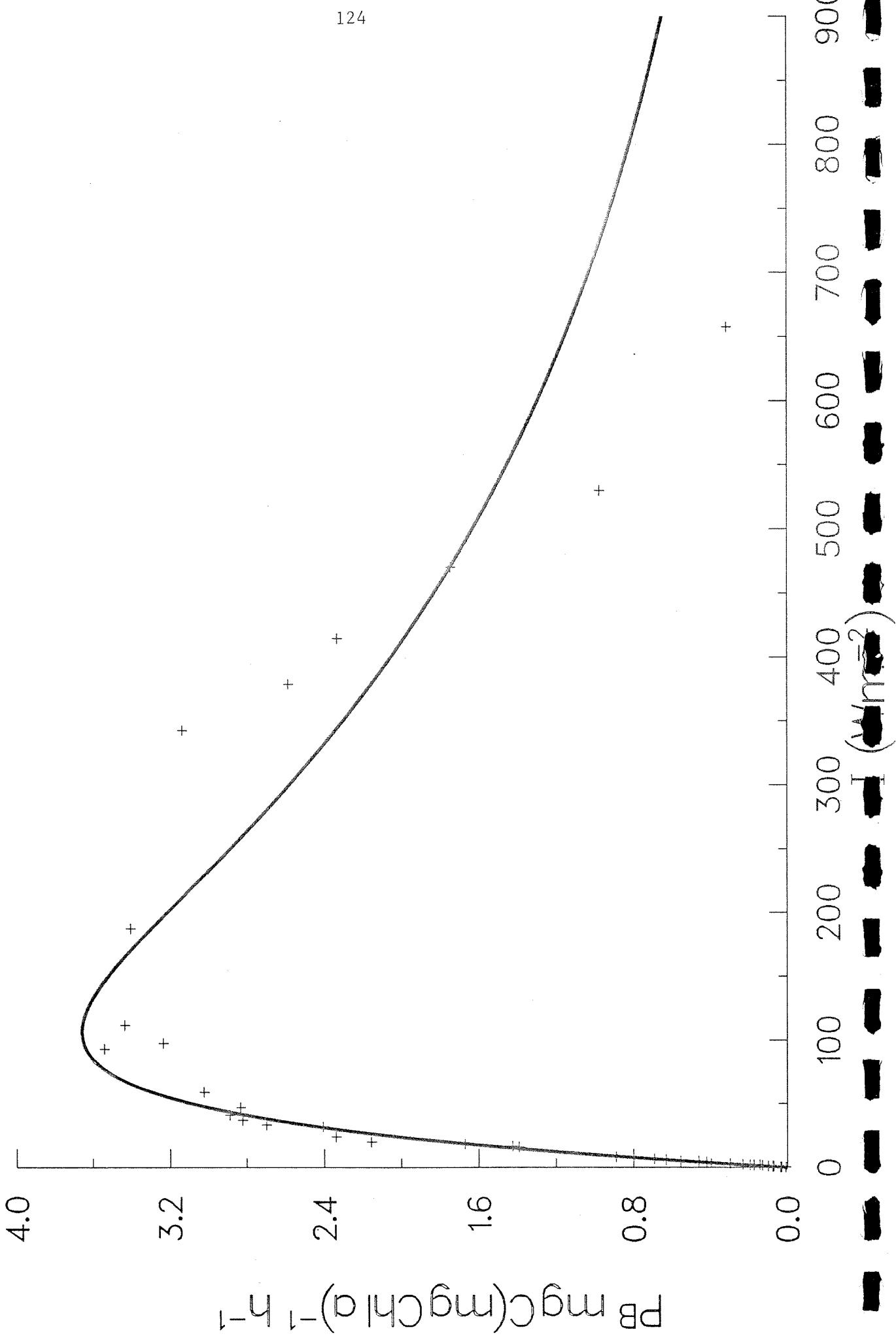


ID 016188<1 STA. 2 23/05/86 30 M



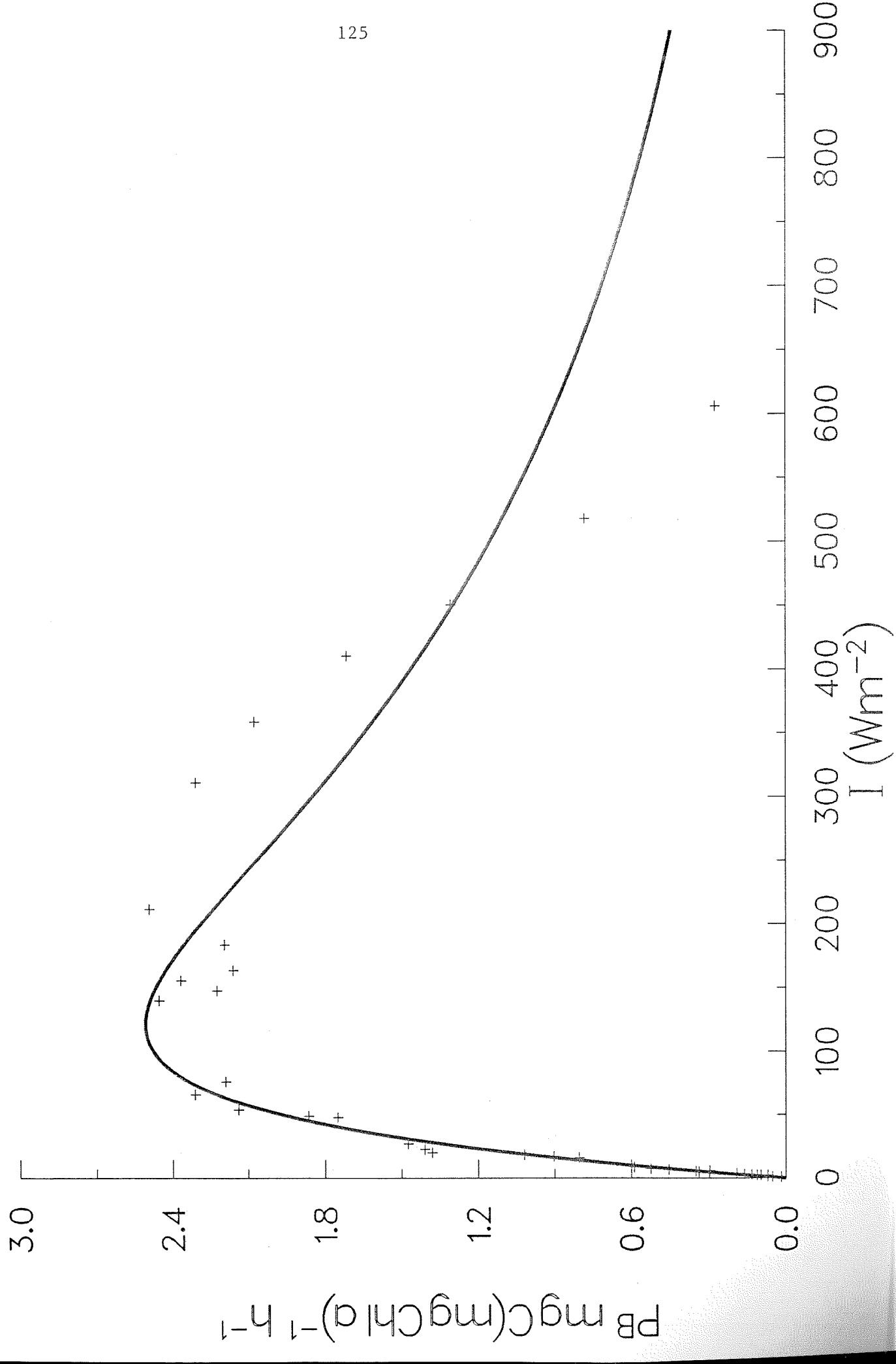
ID 016222W STA. 2 24/05/86 40 M

124



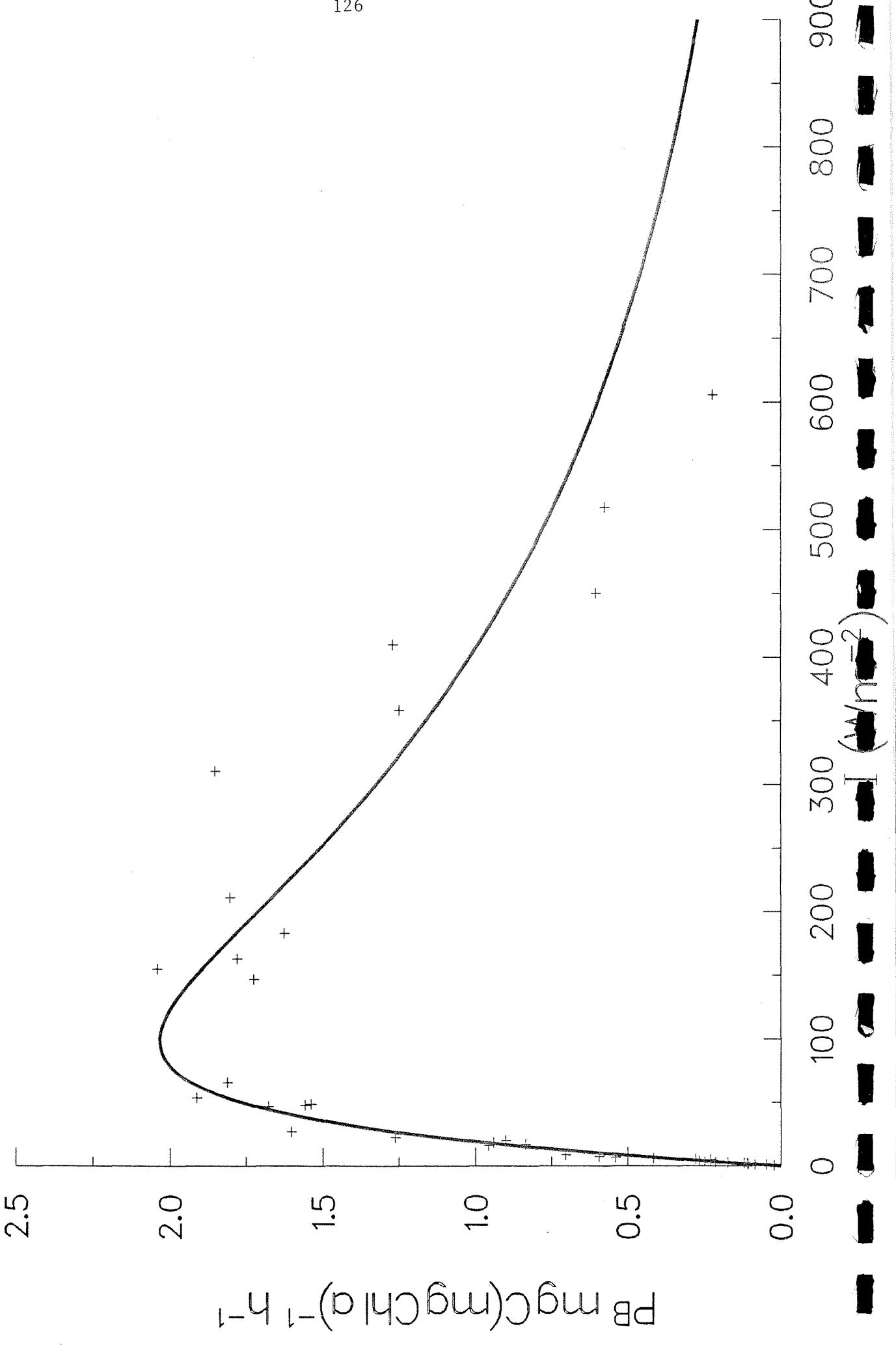
ID 016223>1 STA. 2 24/05/86 40 M

125

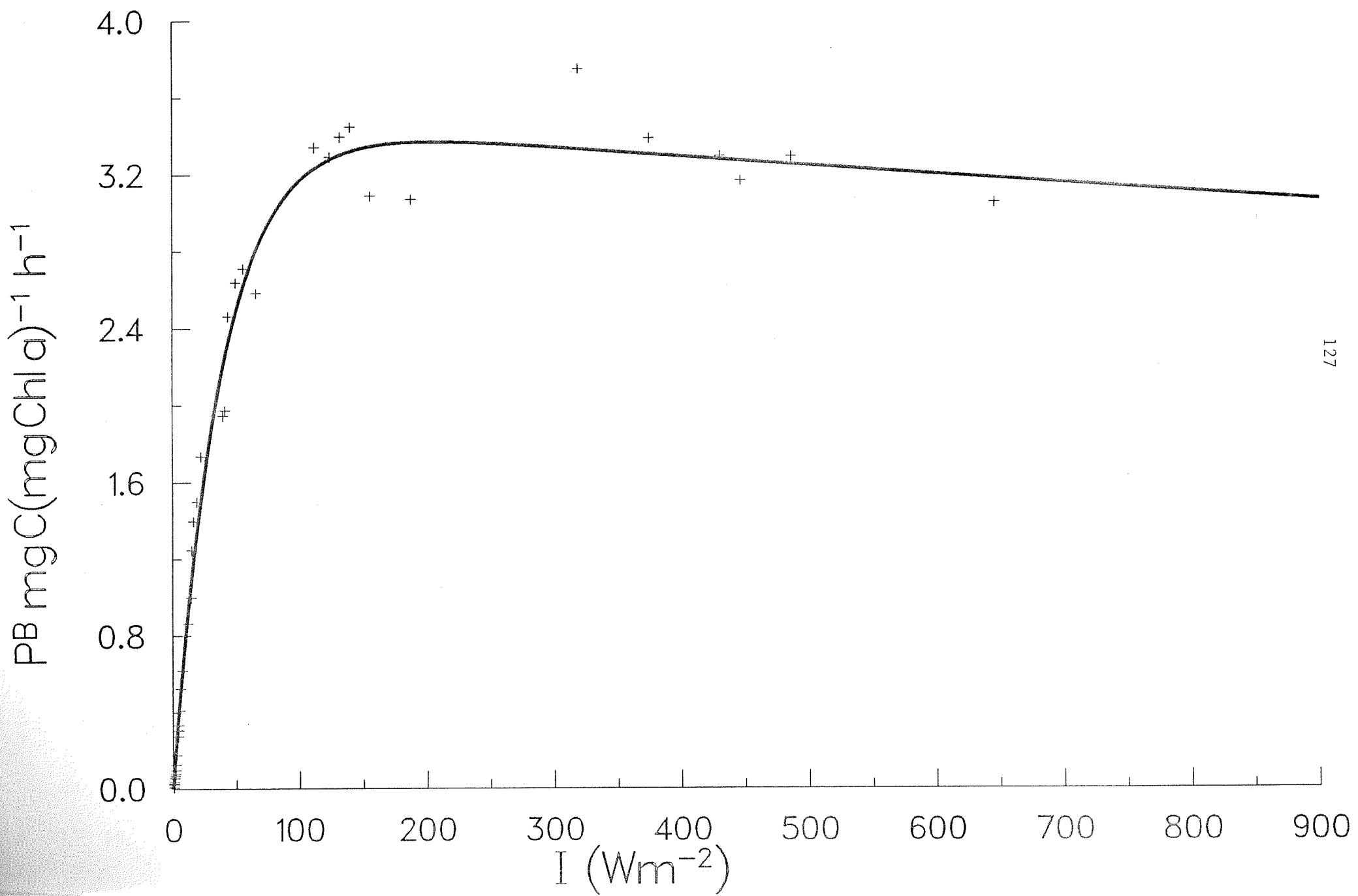


ID 016224<1 STA. 2 24/05/86 40 M

126

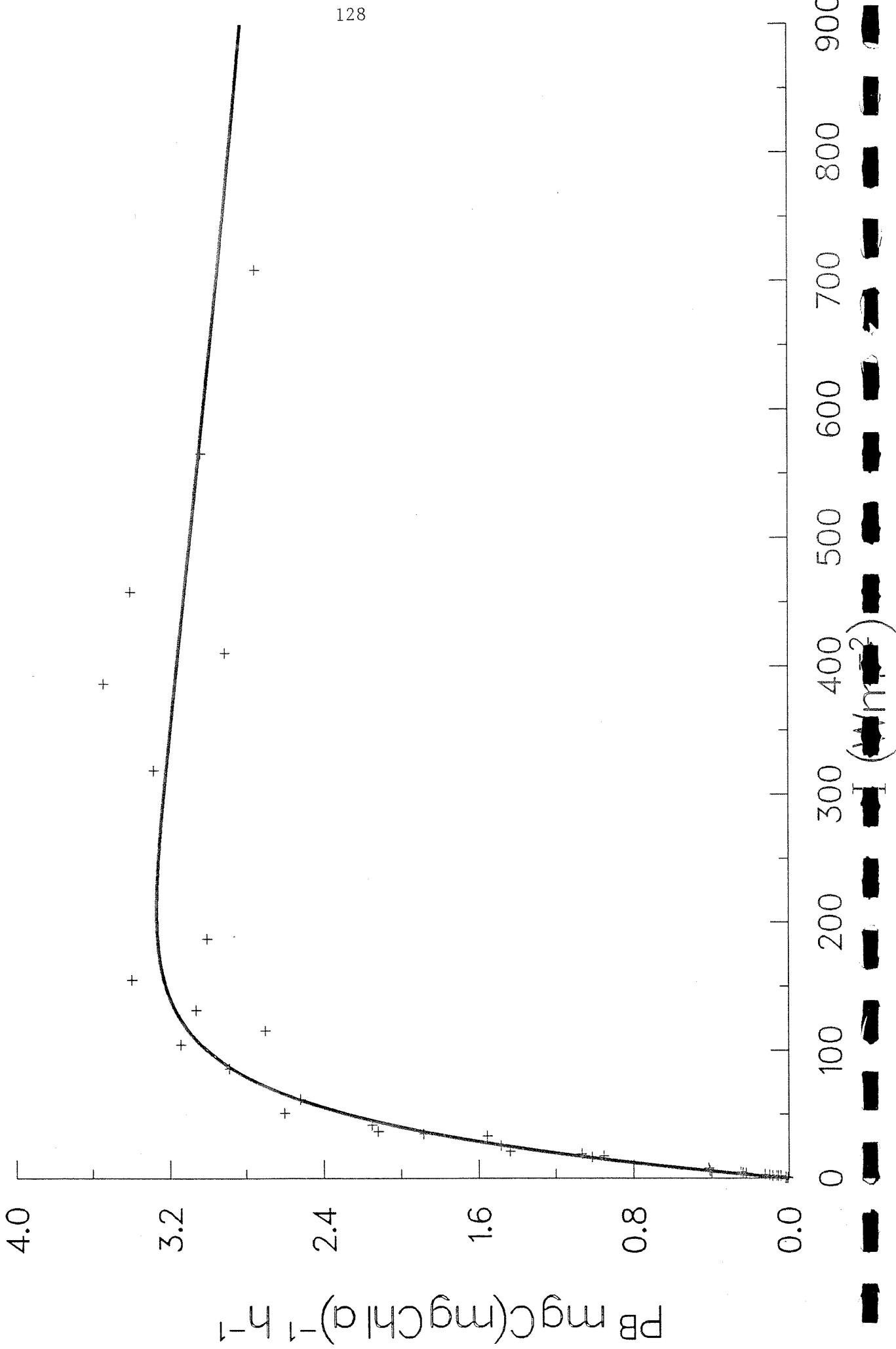


ID 016233W STA. 2 25/05/86 5 M



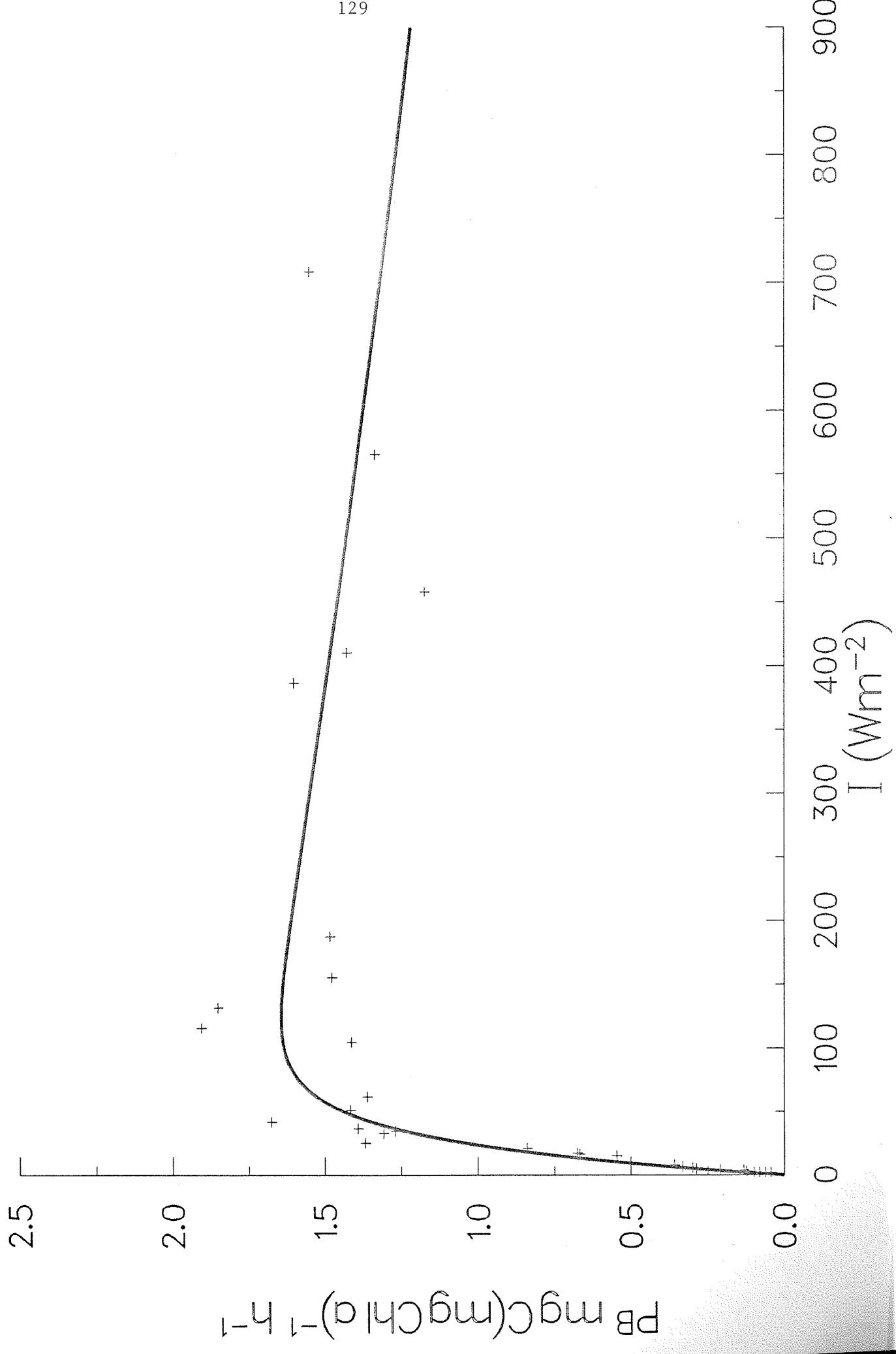
ID 016234>1 STA. 2 25/05/86 5 M

128



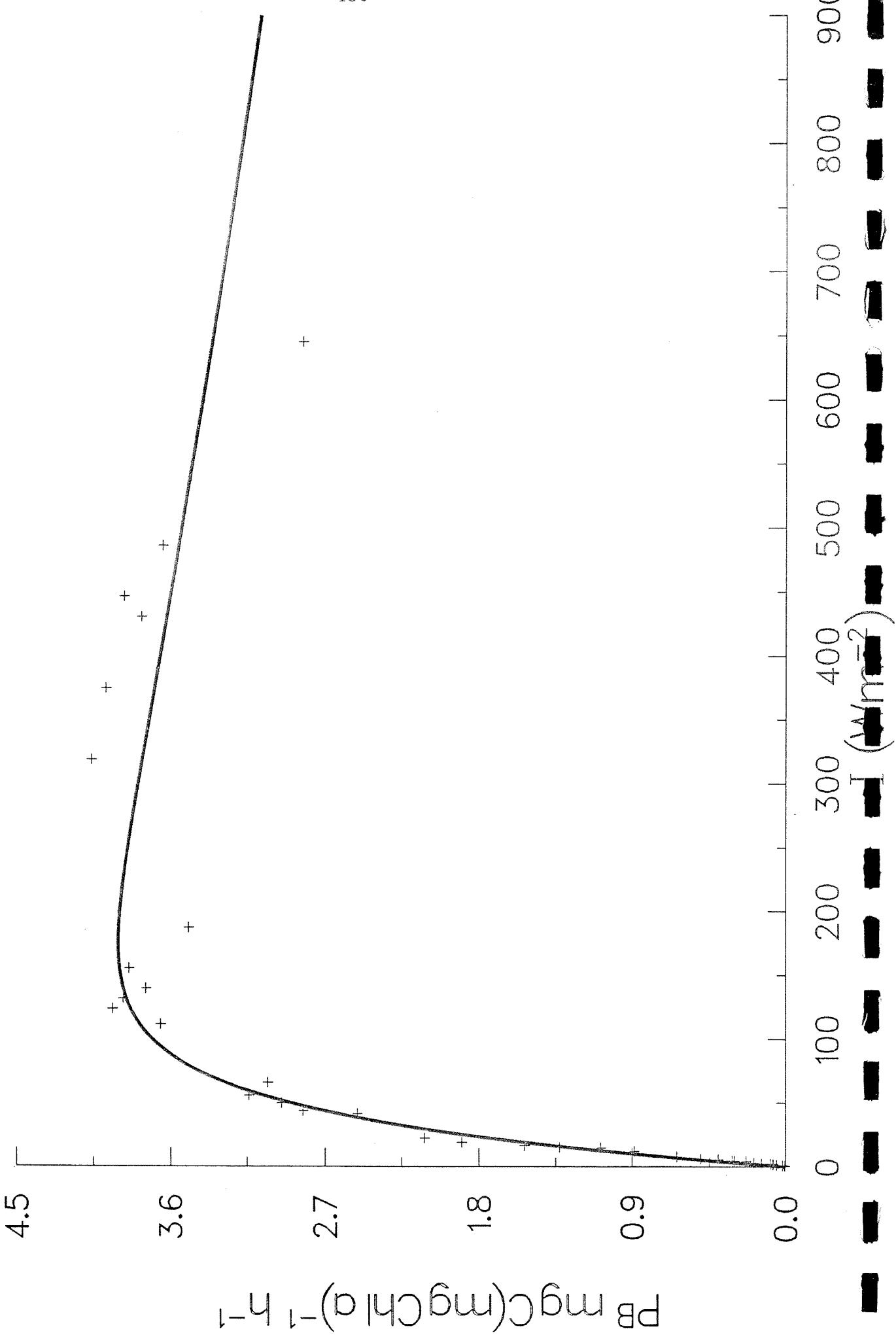
ID 016235<1 STA. 2 25/05/86 5 M

129



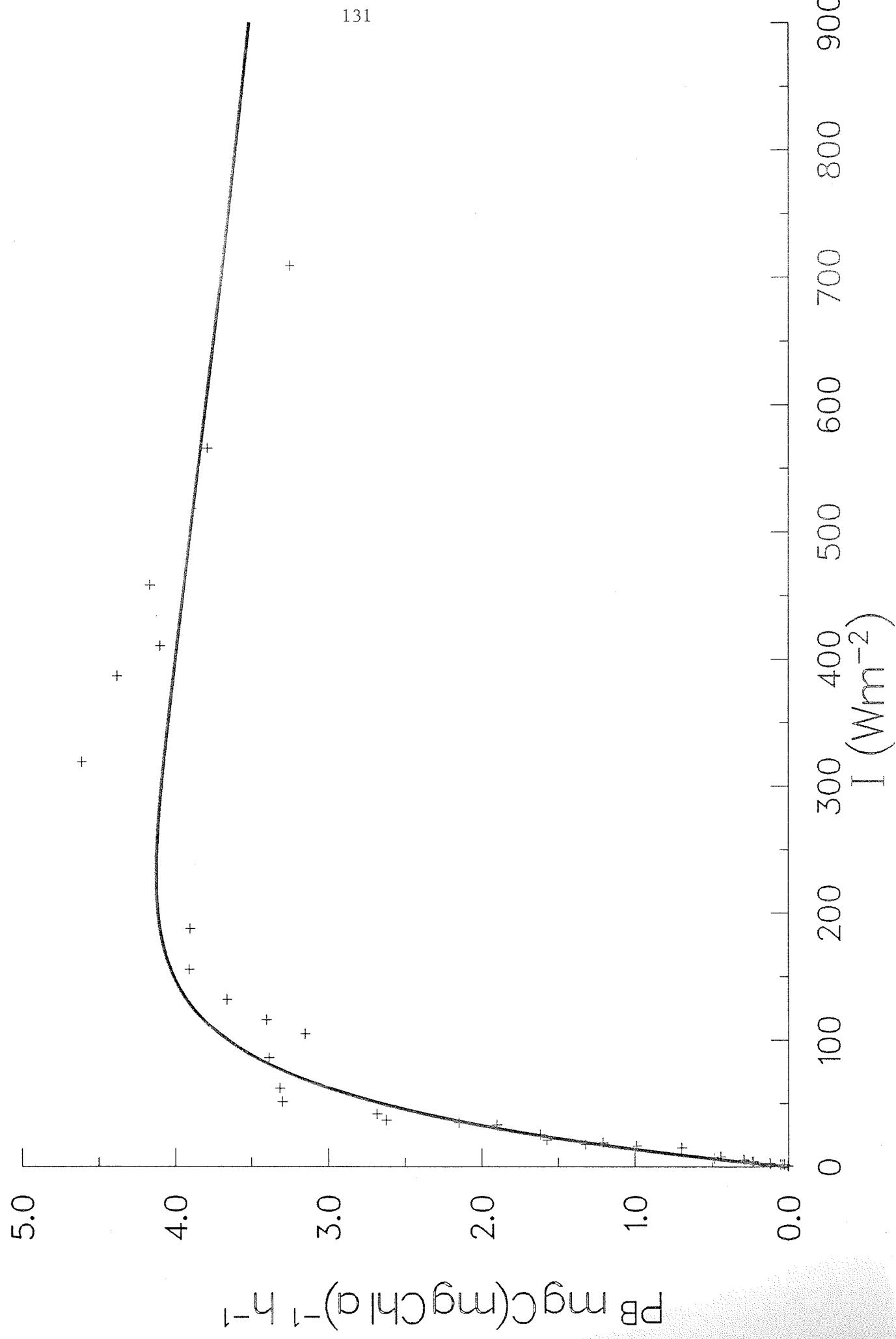
ID 016244W STA. 2 25/05/86 10 M

130



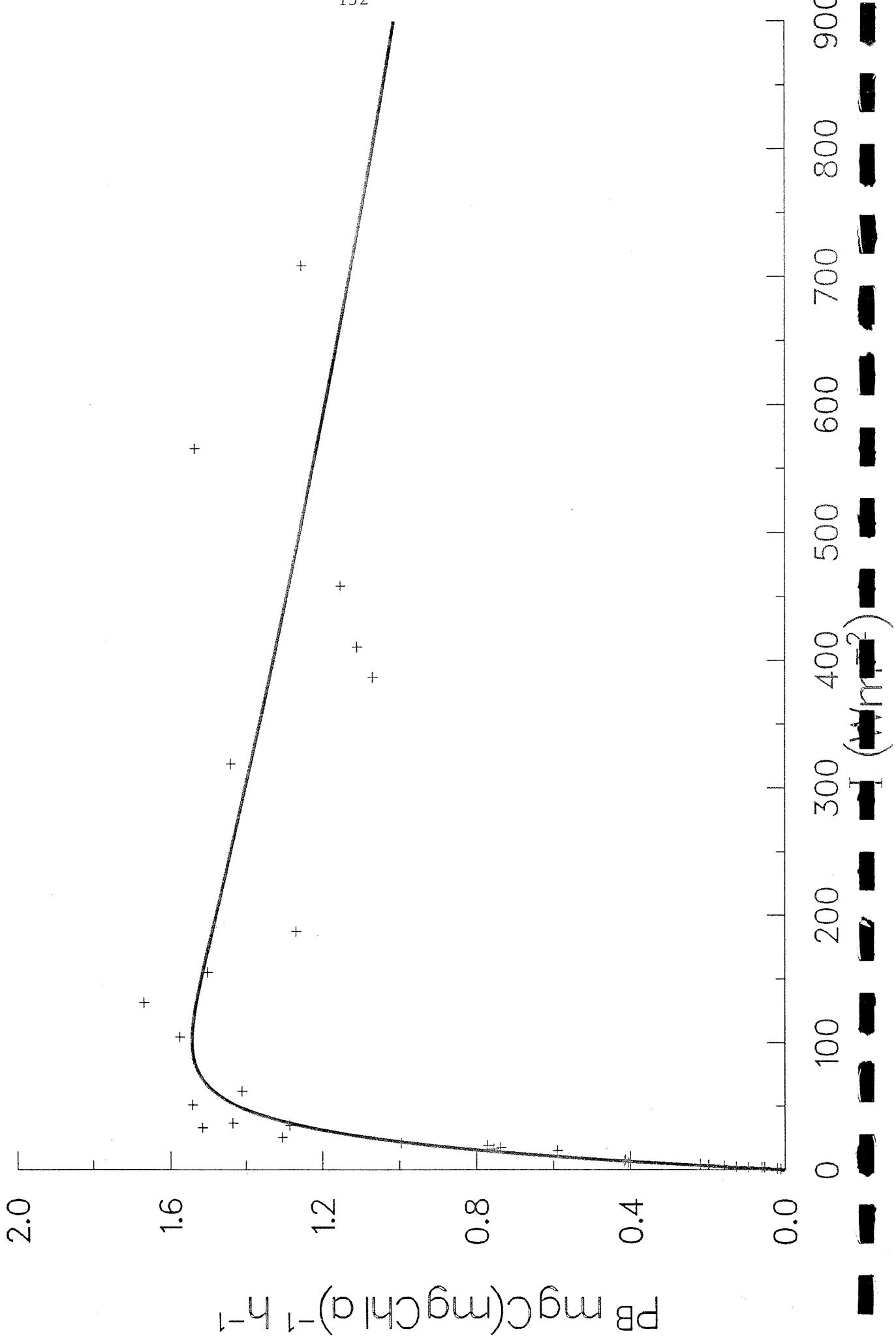
ID 016245>1 STA. 2 25/05/86 10 M

131

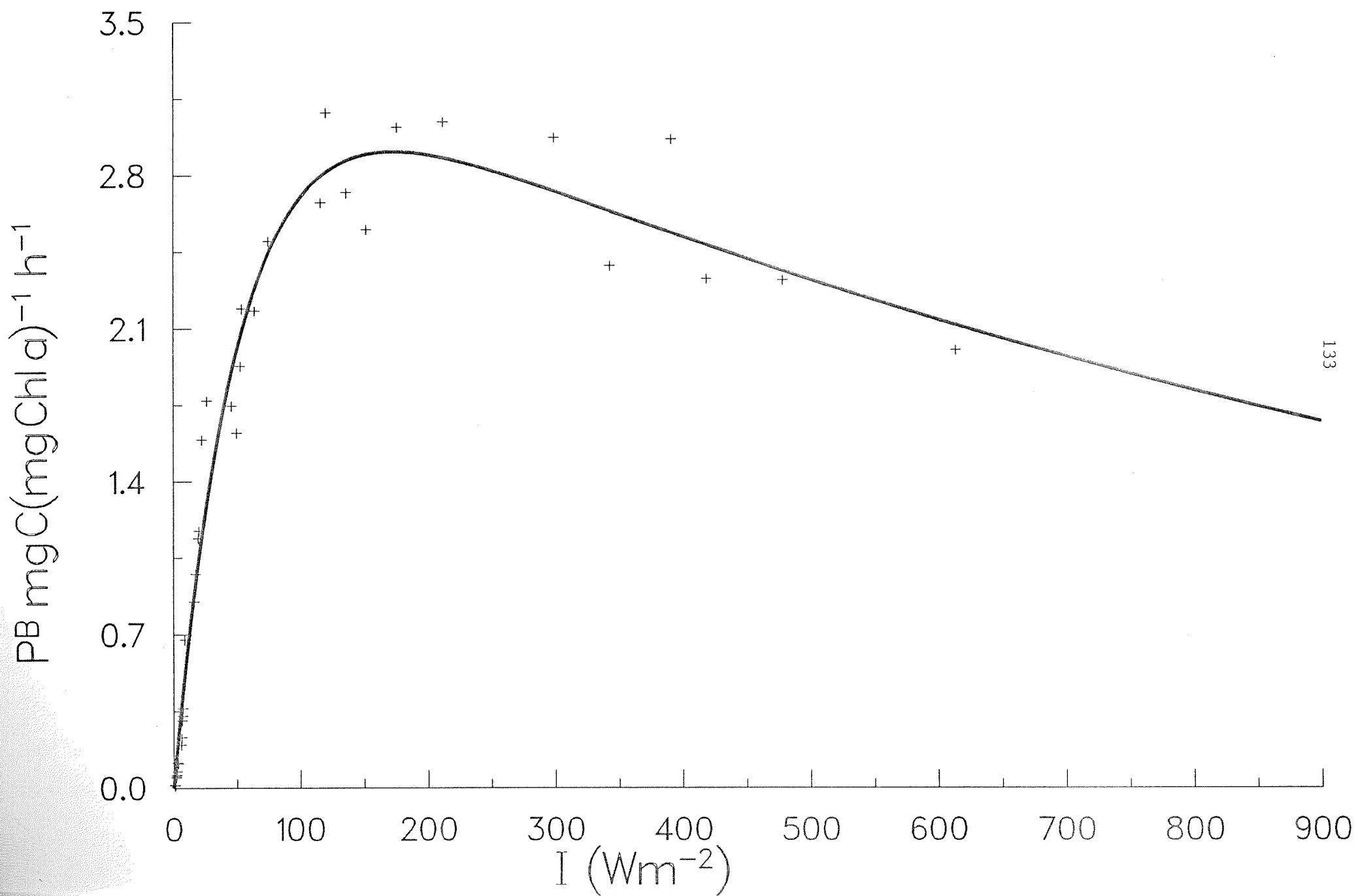


ID 016246<1 STA. 2 25/05/86 10 M

132



ID 016253W STA. 2 26/05/86 15 M



ID 016254>1 STA. 2 26/05/86 15 M

3.5

2.8

2.1

1.4

0.7

0.0

$P_B \text{ mgC}(\text{mgChl}\alpha)^{-1} \text{ h}^{-1}$

134

900

800

700

600

500

400

300

200

100

0

$I (\text{W/m}^{-2})$

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

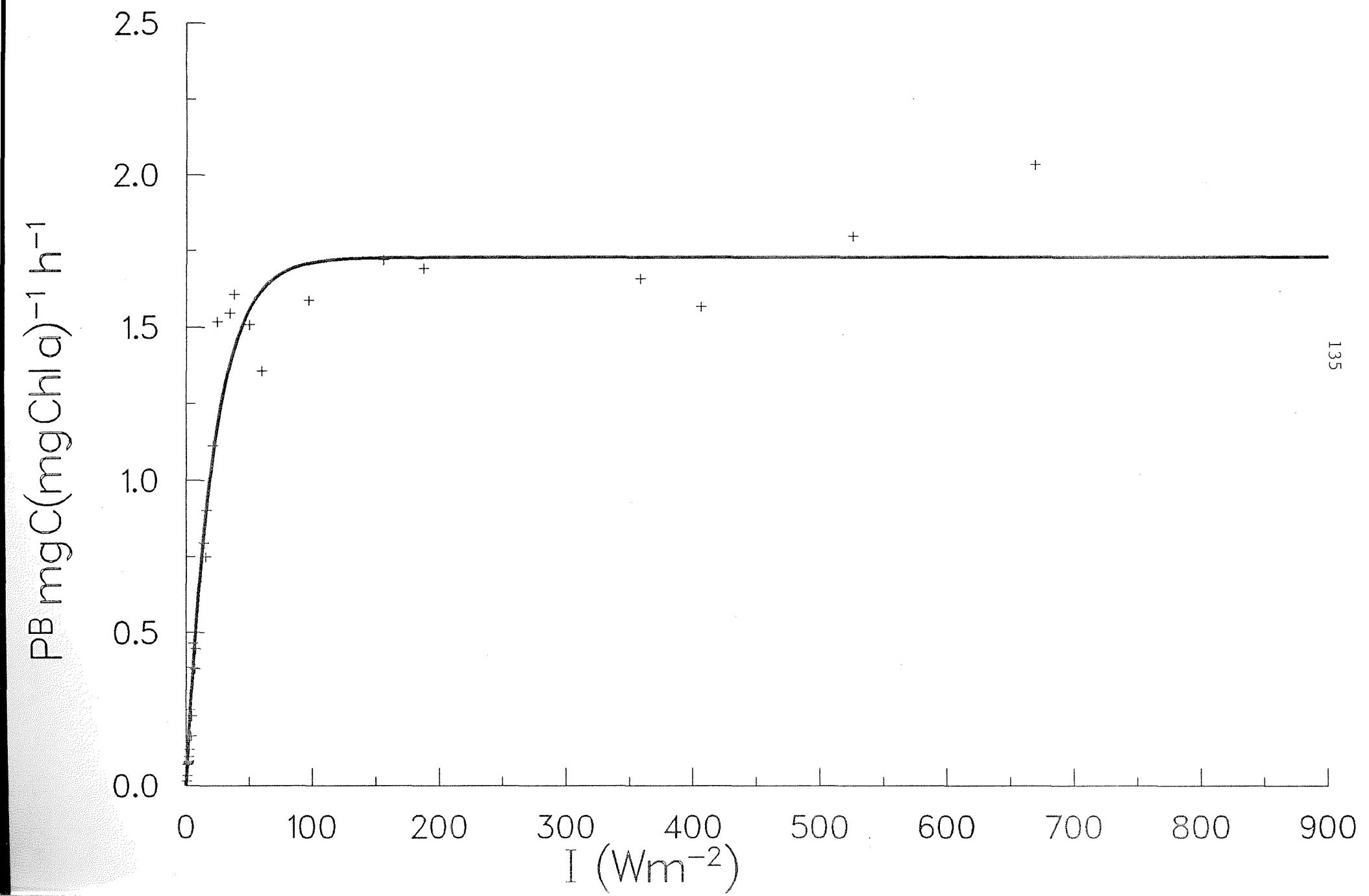
+

+

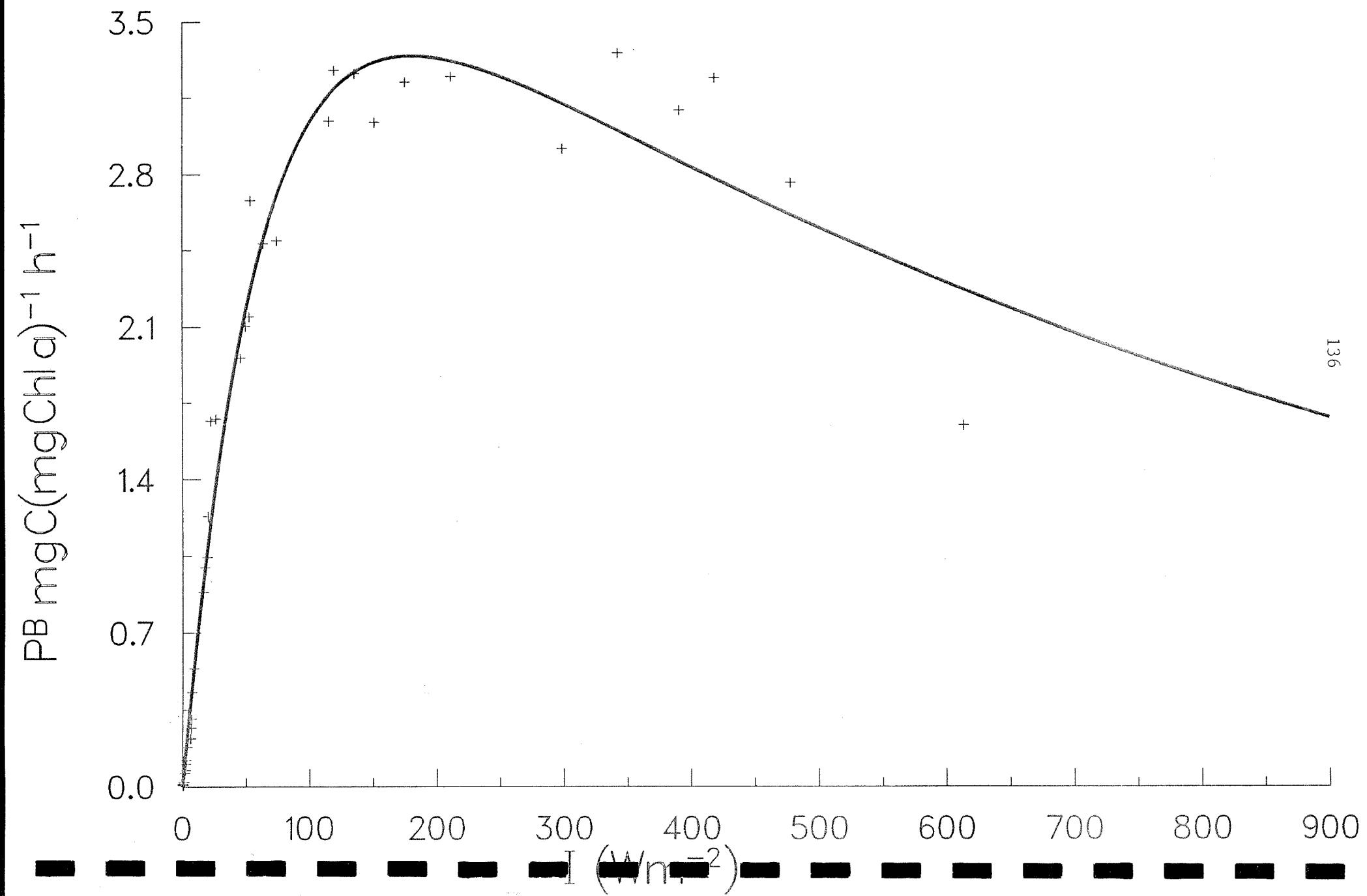
+

+

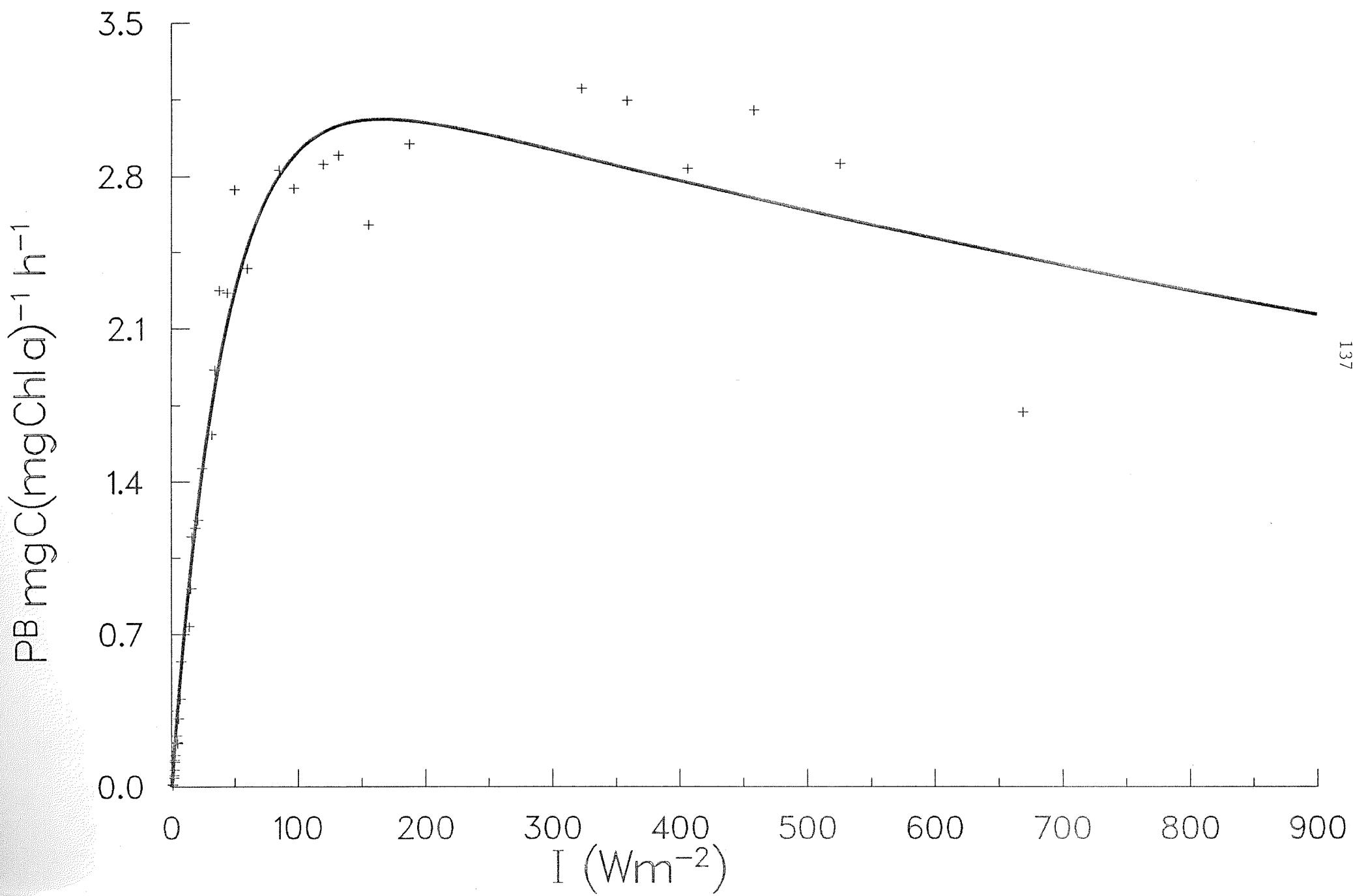
ID 016255<1 STA. 2 26/05/86 15 M



ID 016264W STA. 2 26/05/86 20 M

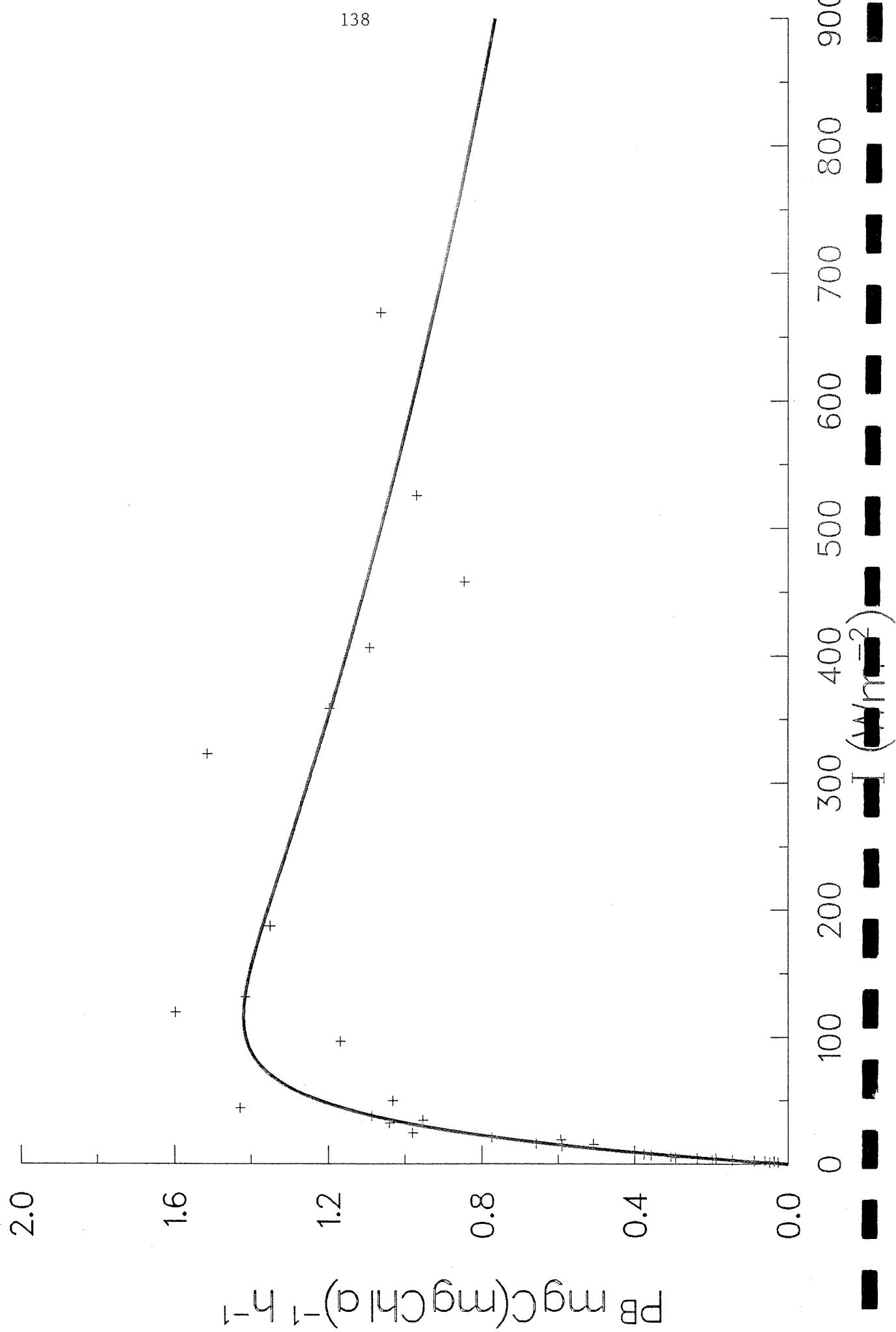


ID 016265>1 STA. 2 26/05/86 20 M

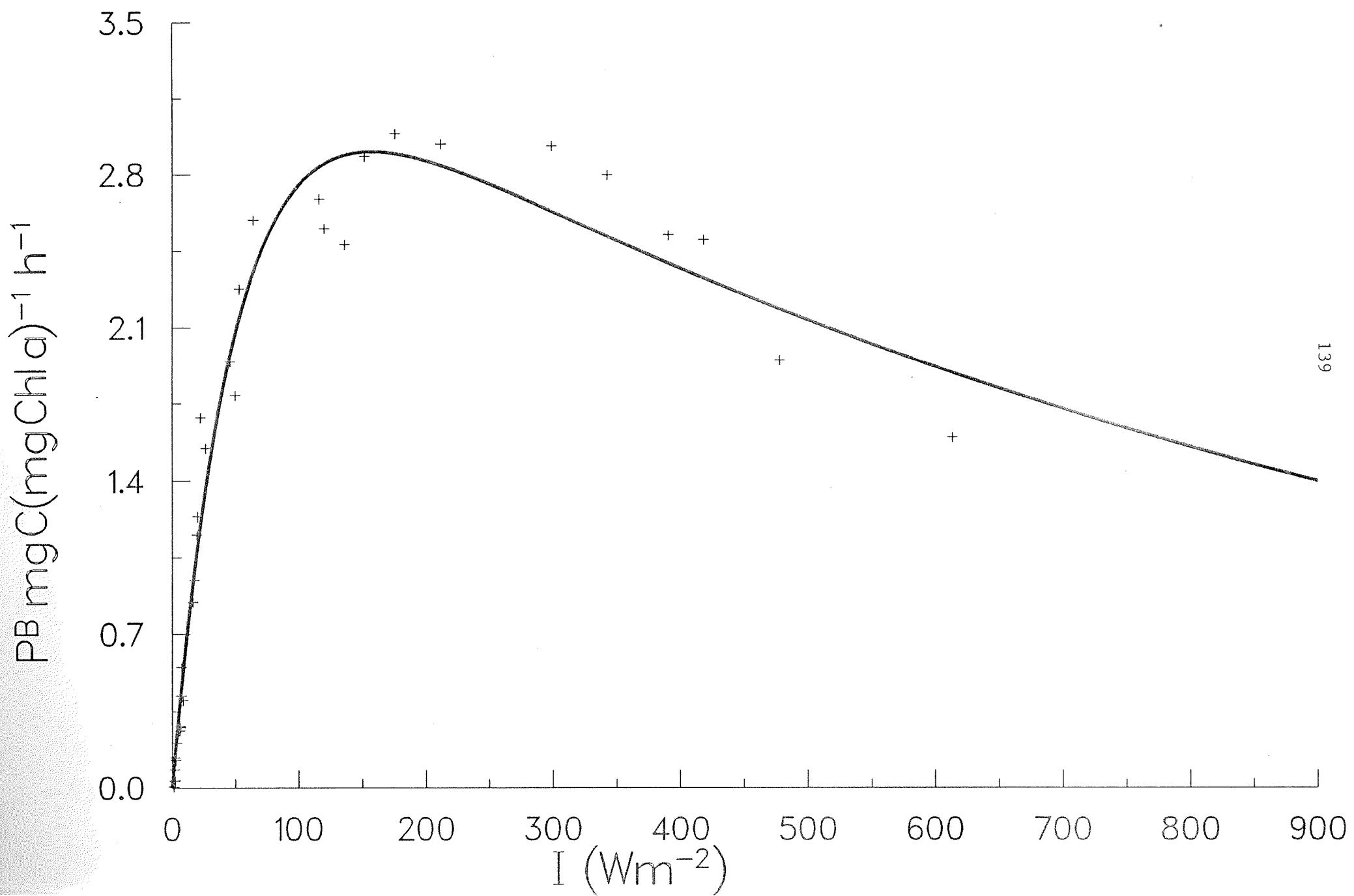


ID 016266<1 STA. 2 26/05/86 20 M

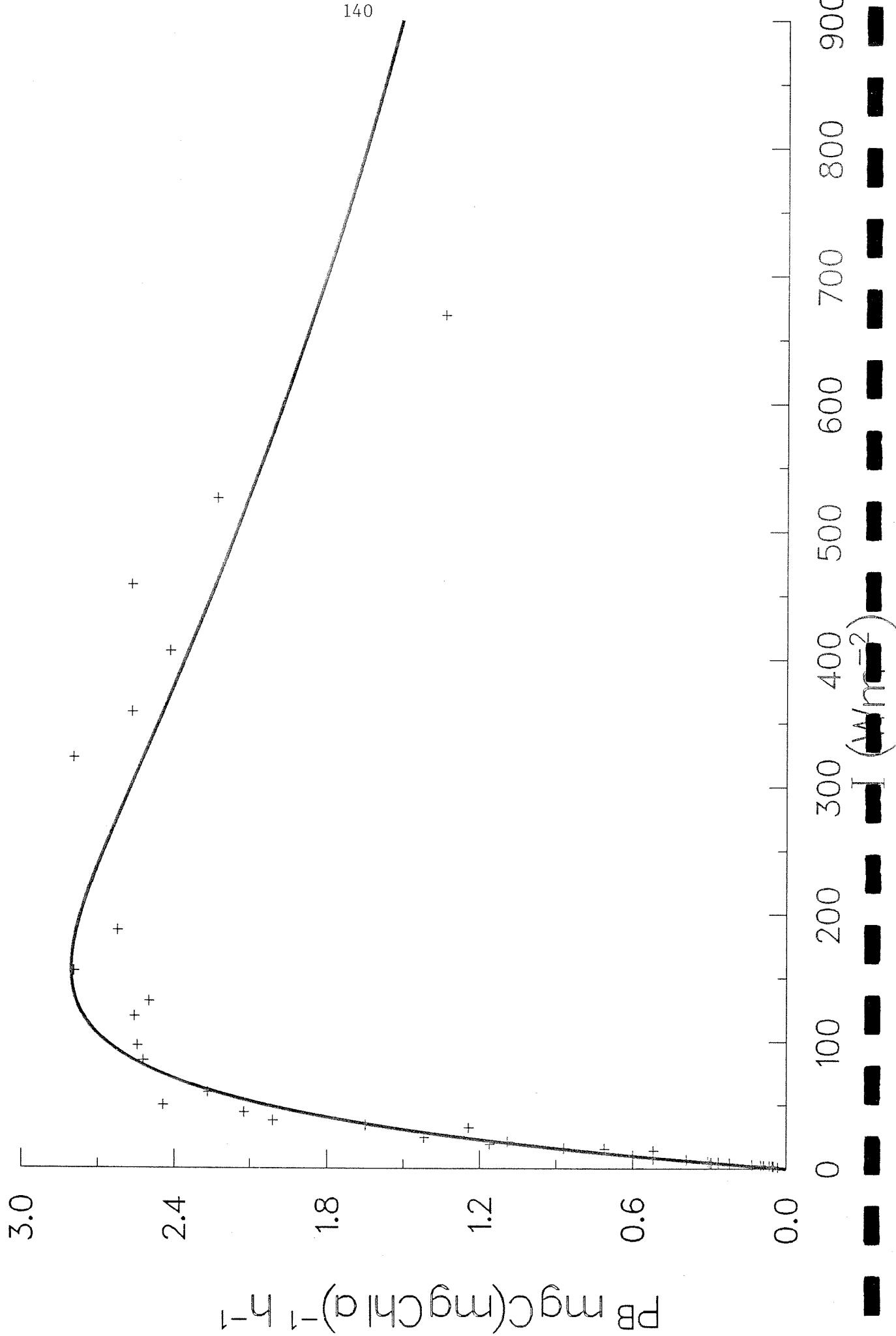
138



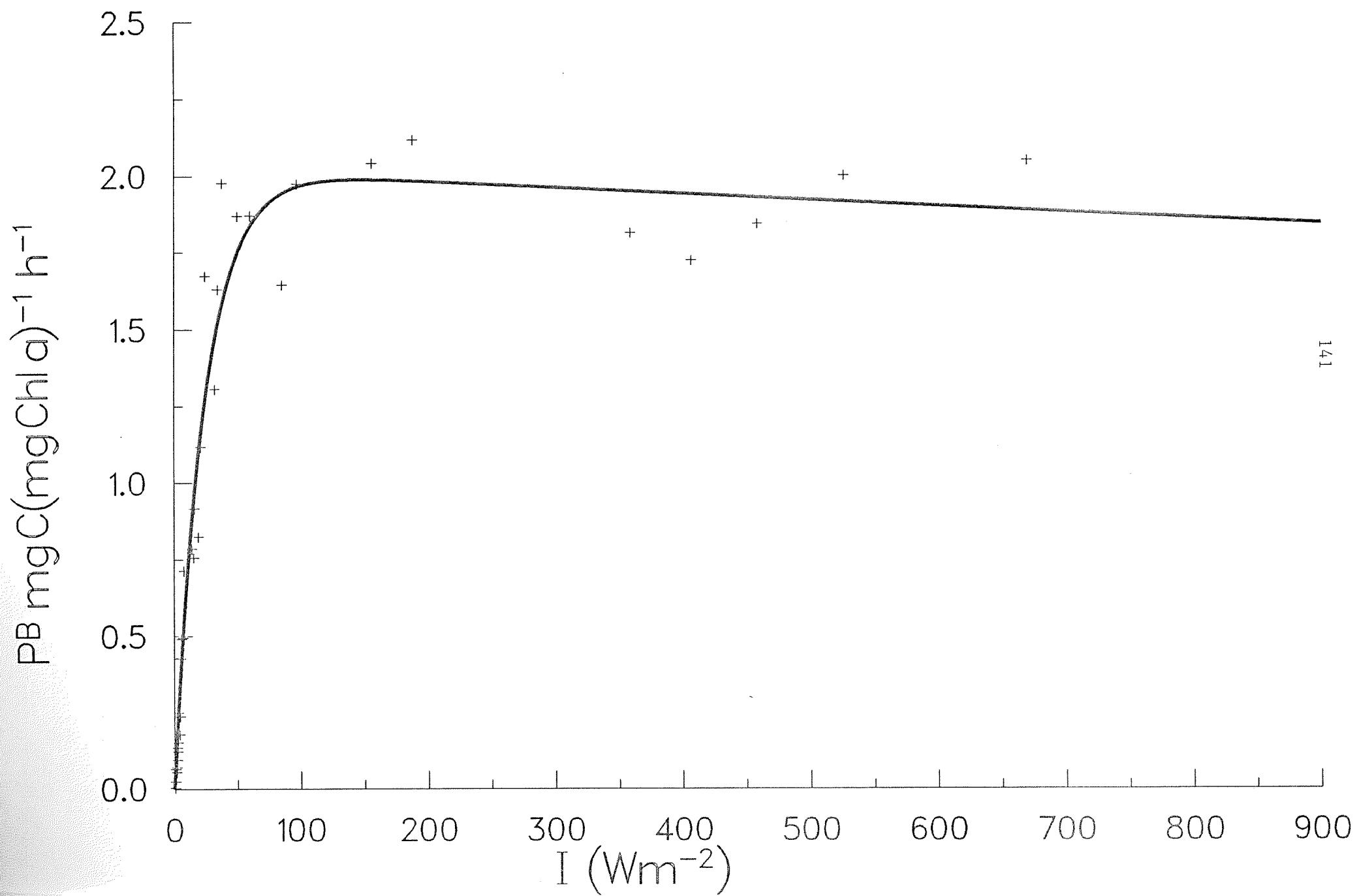
ID 016267W STA. 2 27/05/86 25 M



ID 016268>1 STA. 2 27/05/86 25 M

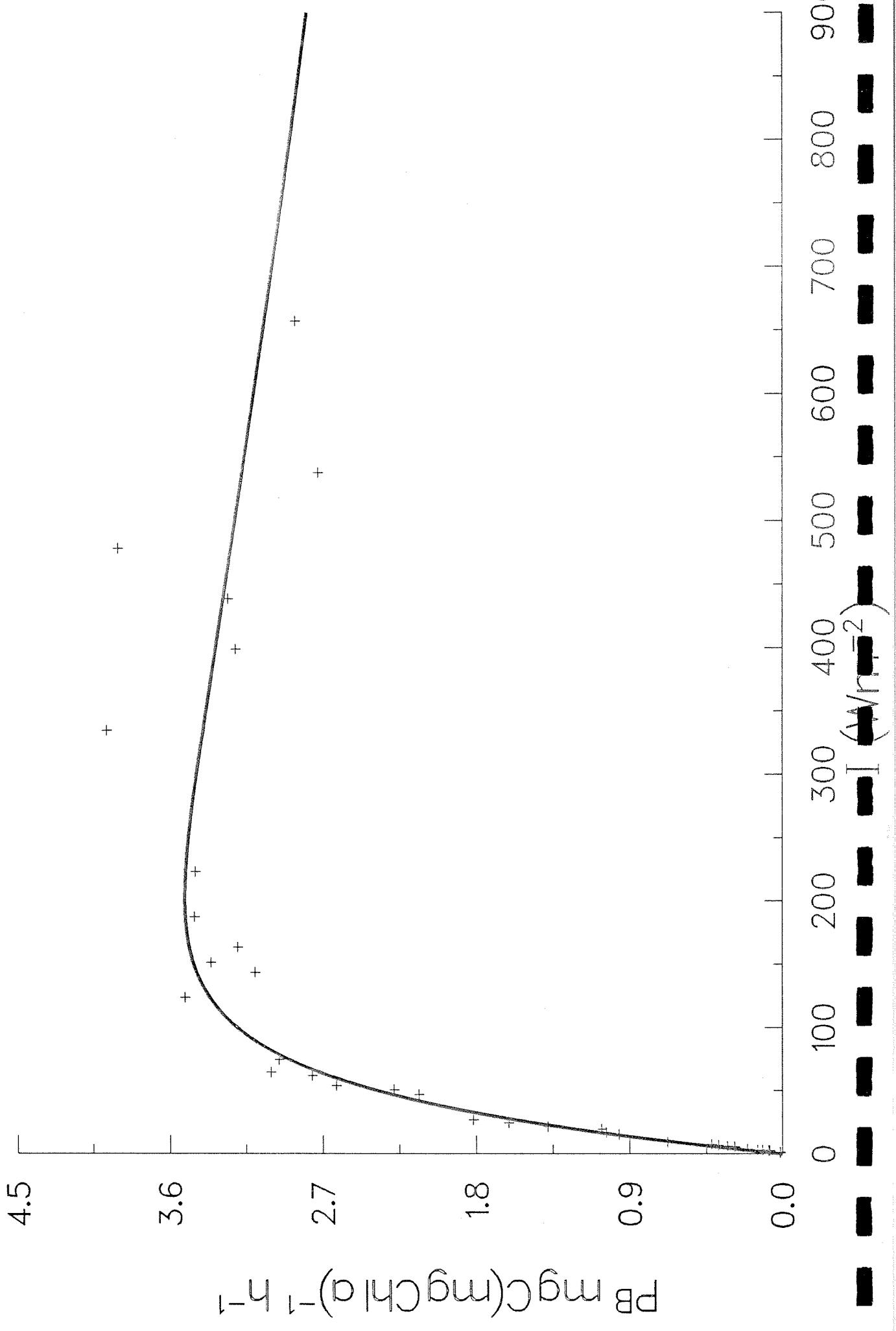


ID 016269<1 STA. 2 27/05/86 25 M

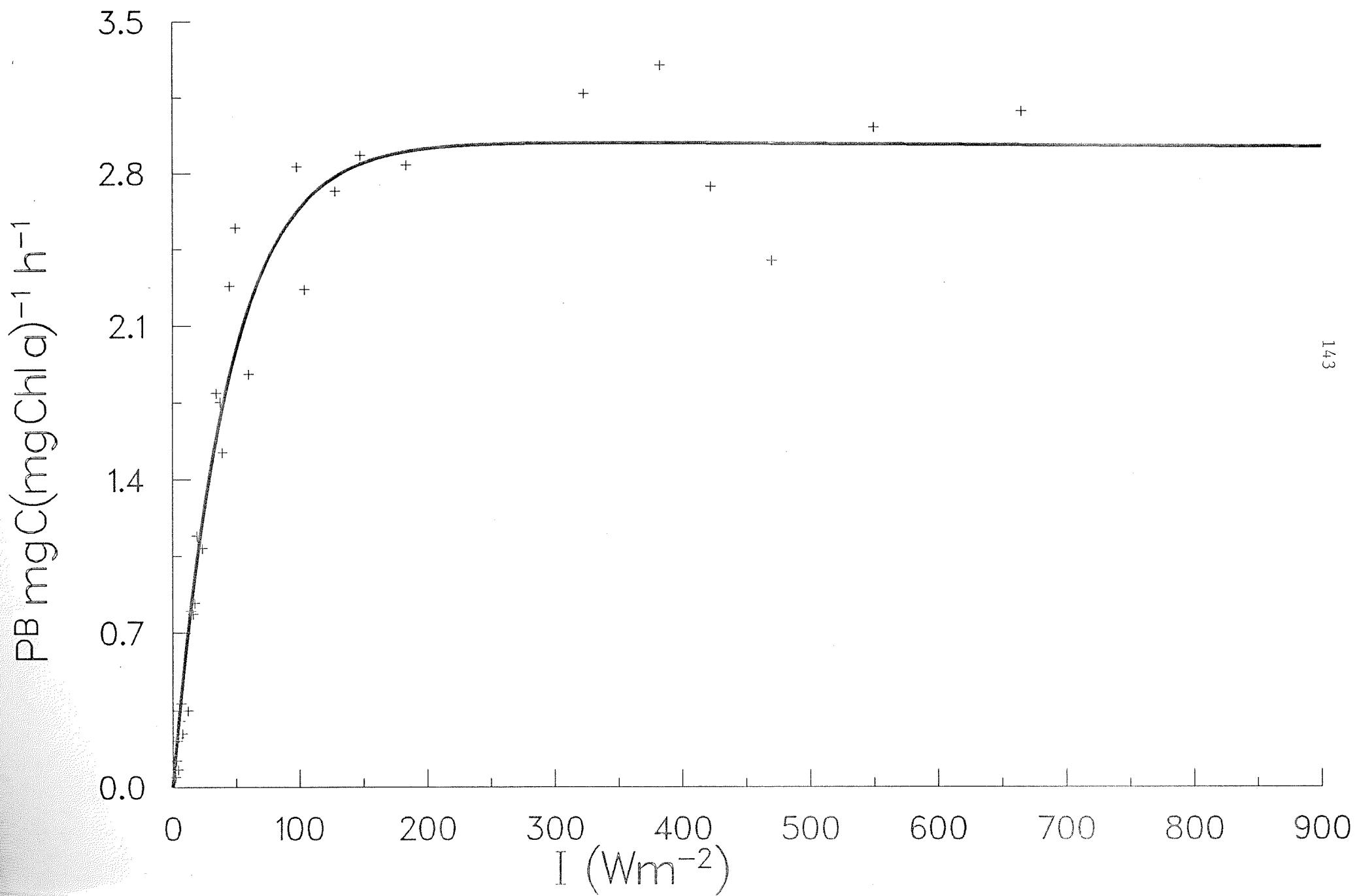


ID 016270W STA. 2 29/05/86 5 M

142

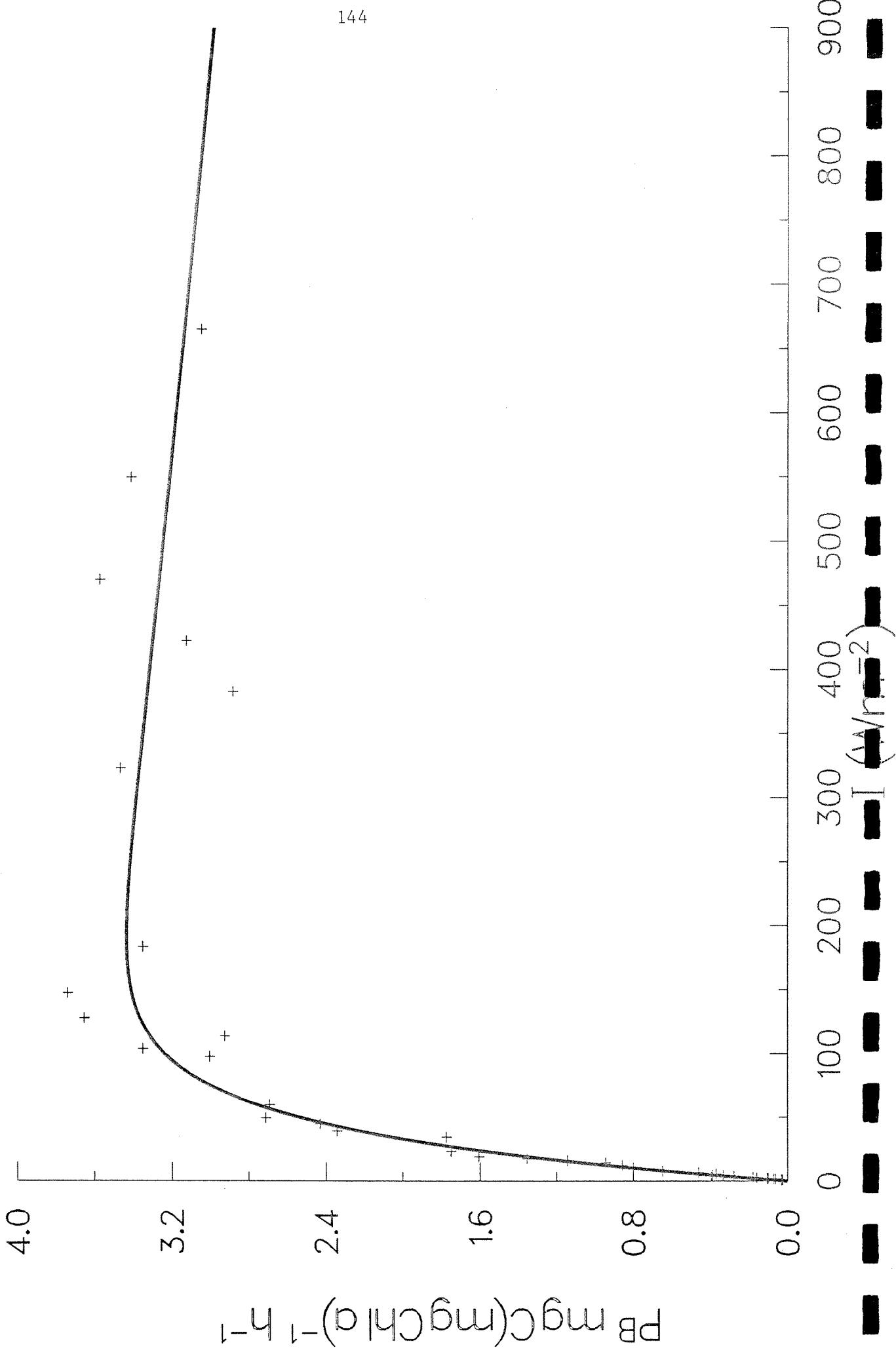


ID 016271>5 STA. 2 29/05/86 5 M



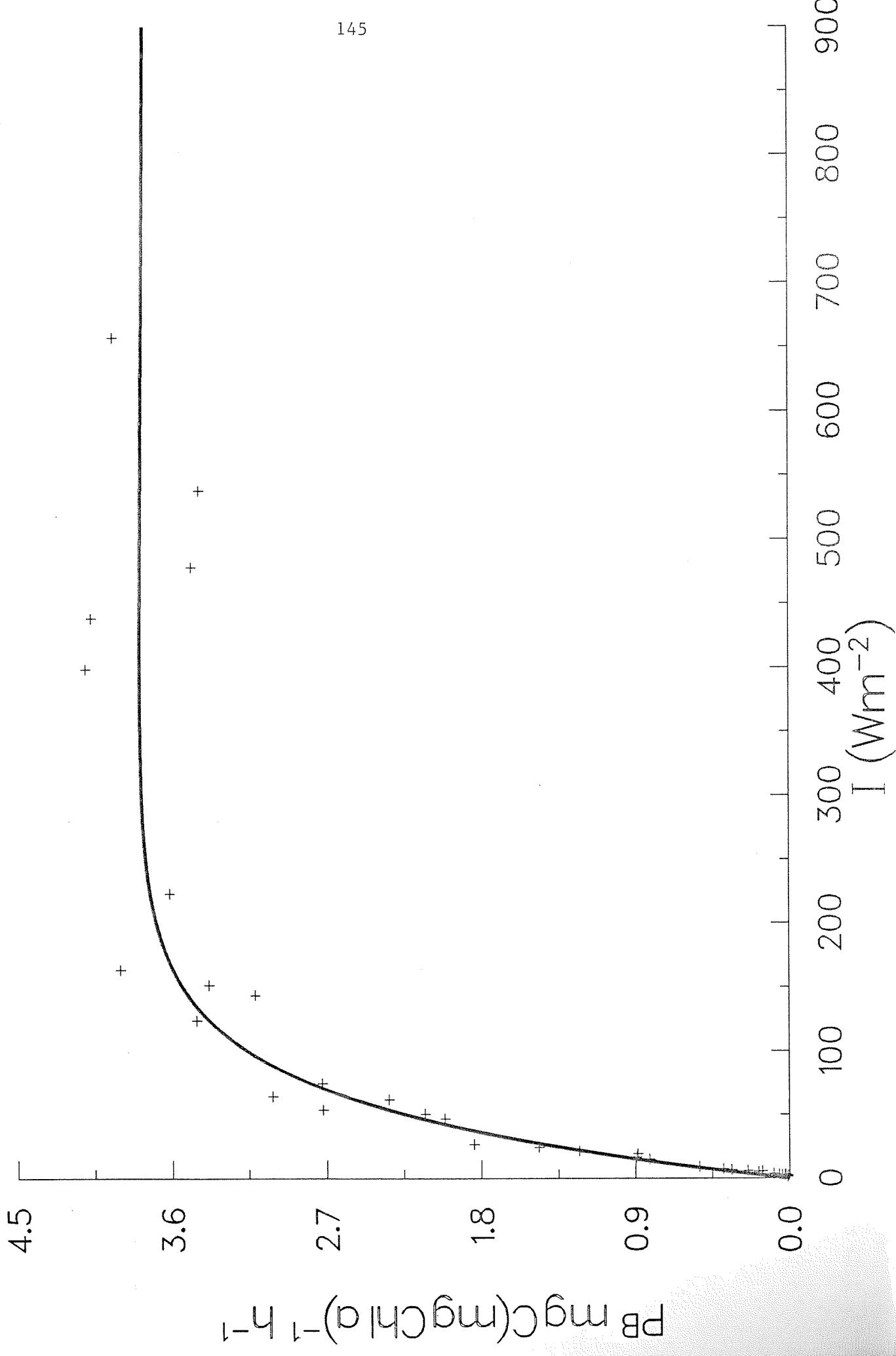
ID 016272<5 STA. 2 29/05/86 5 M

144



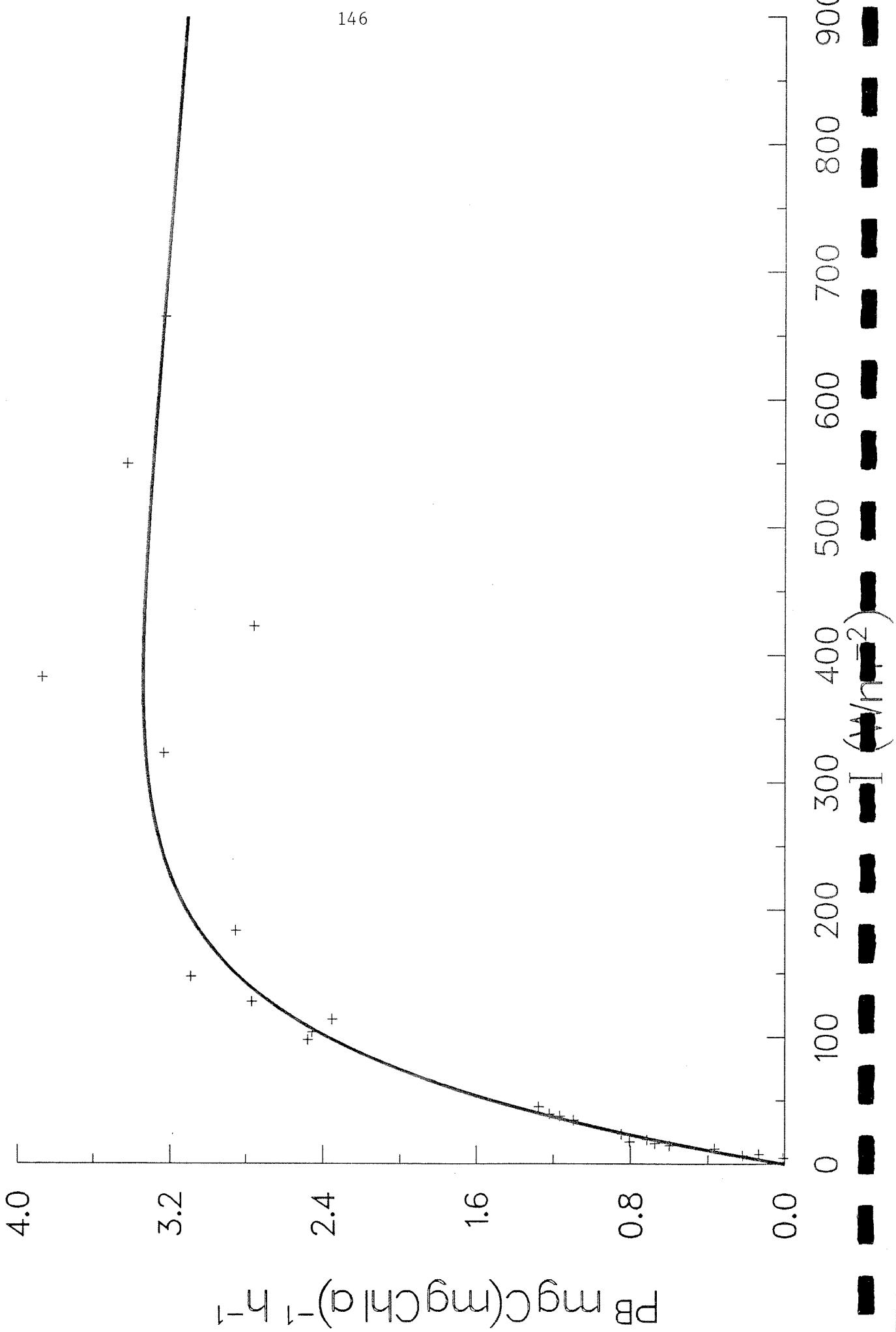
ID 016289W STA. 2 29/05/86 10 M

145



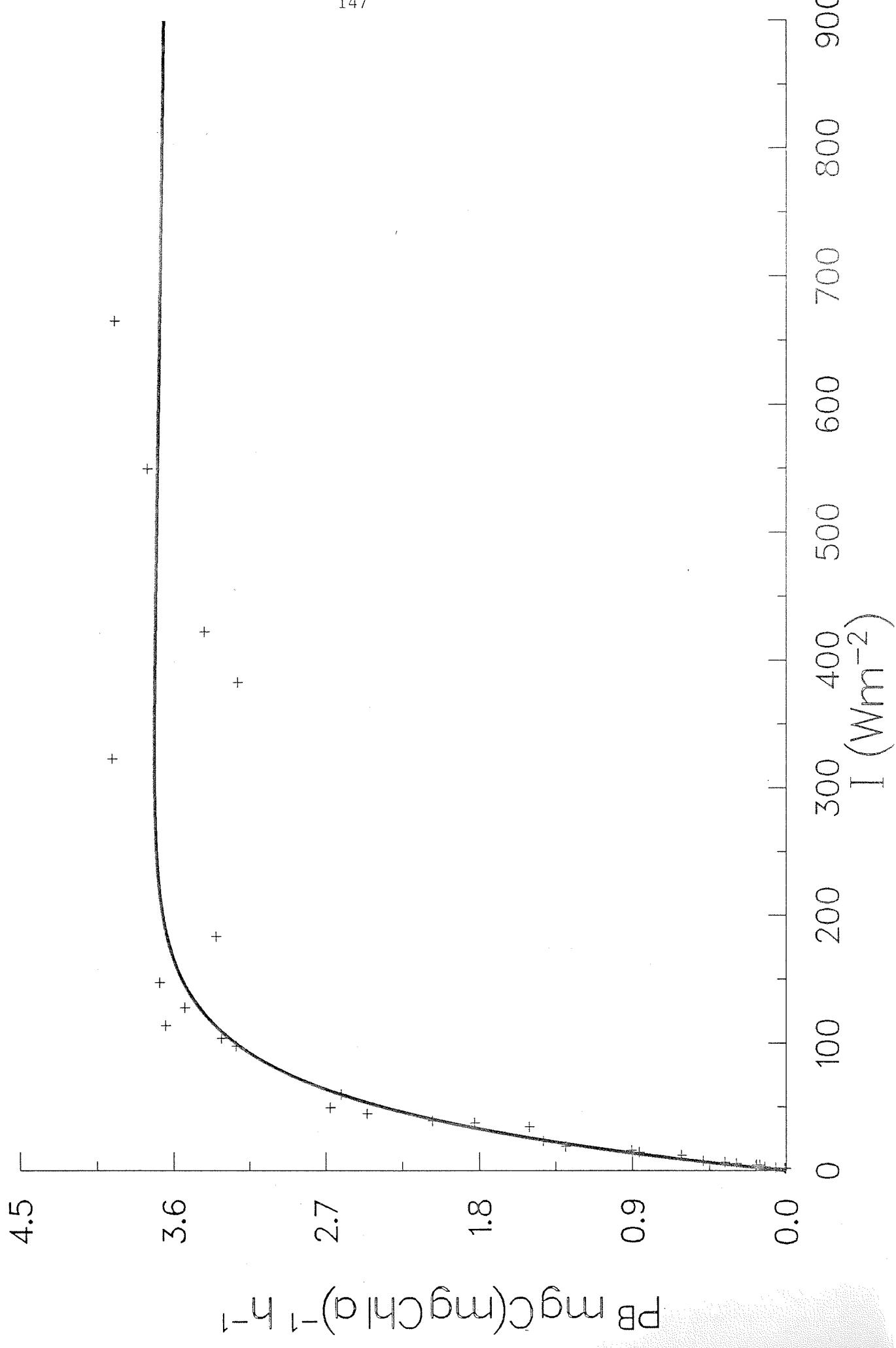
ID 016290>5 STA. 2 29/05/86 10 M

146

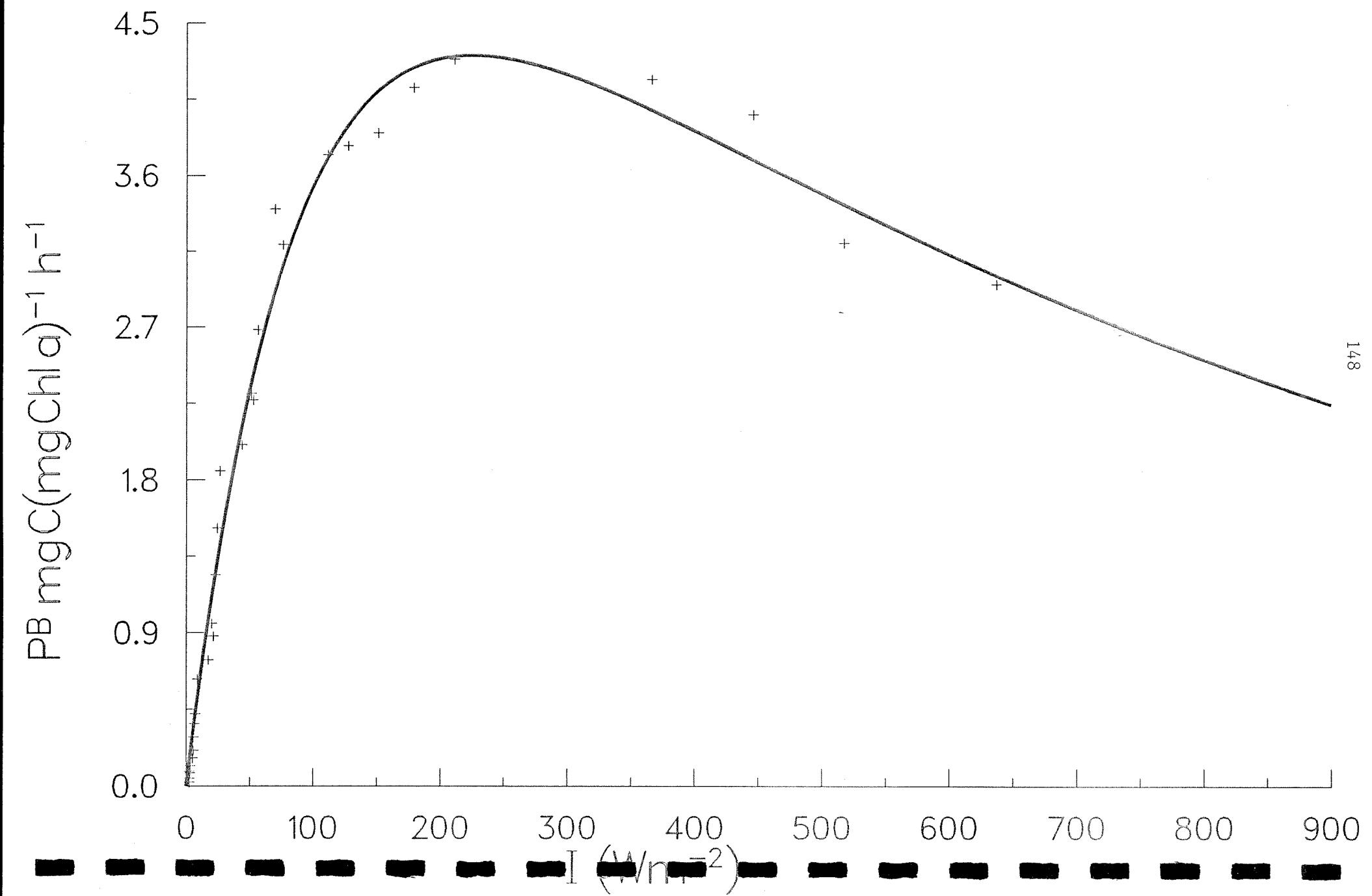


ID 016291<5 STA. 2 29/05/86 10 M

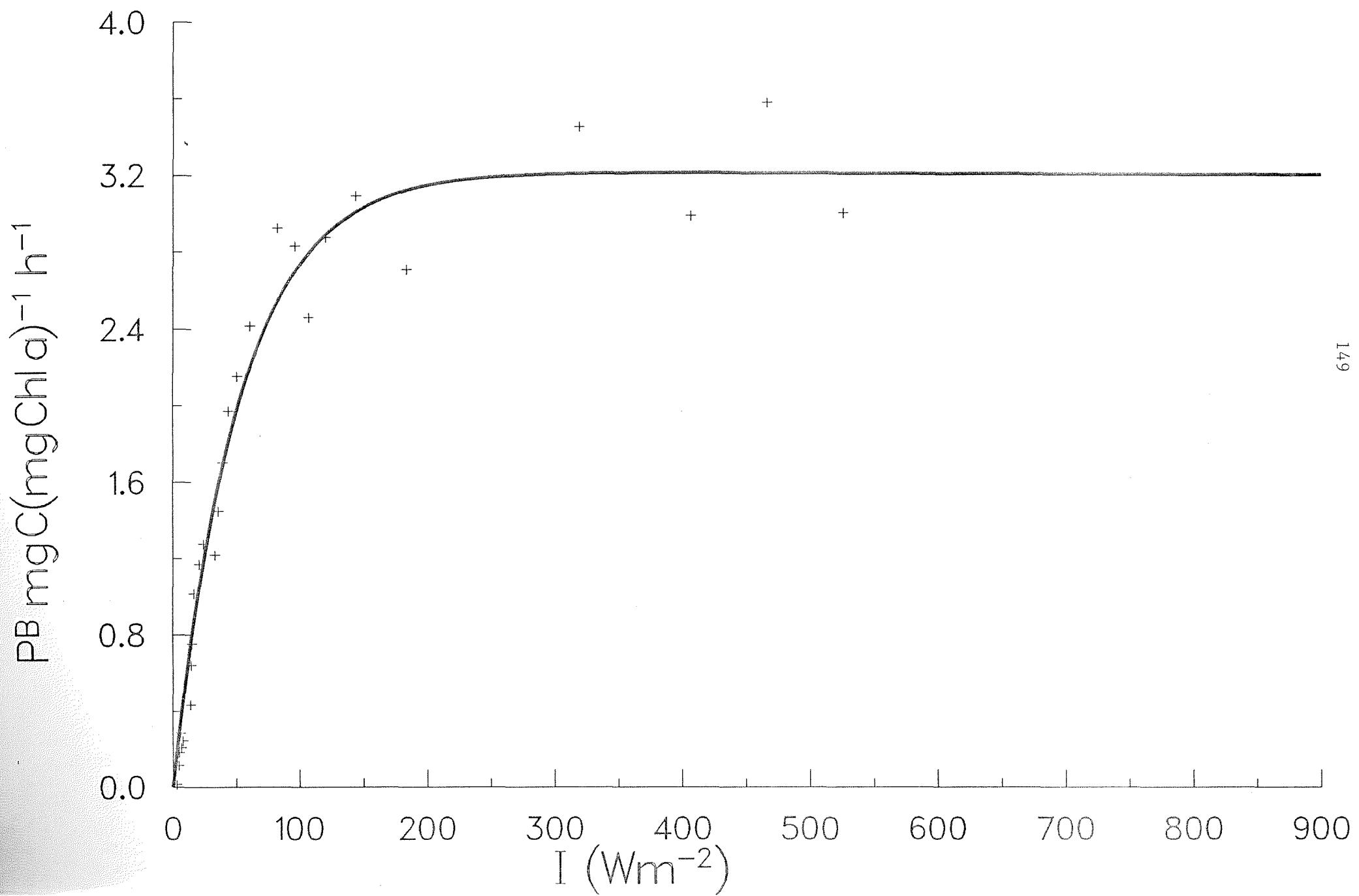
147



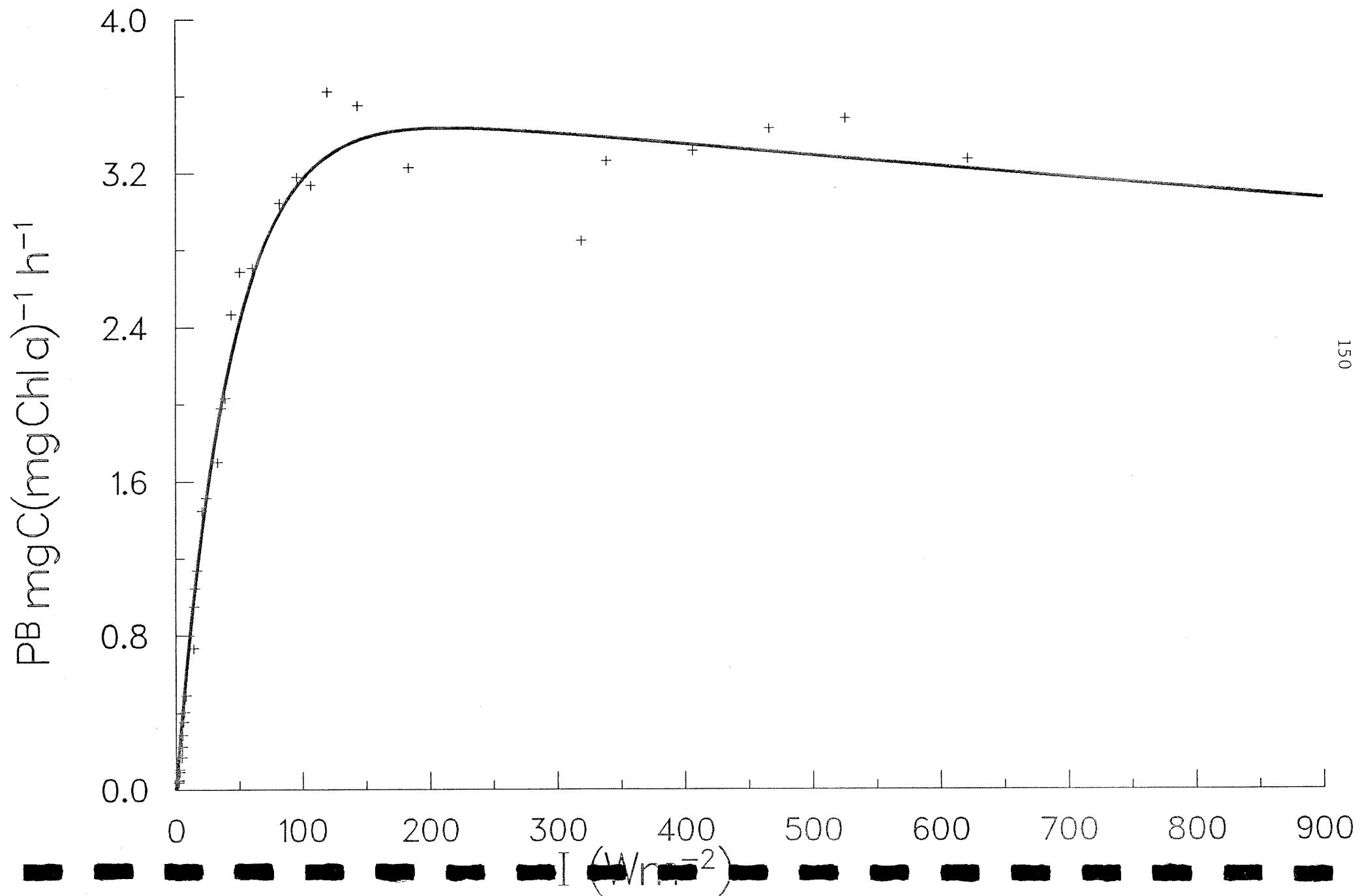
ID 016314W STA. 2 30/05/86 15 M



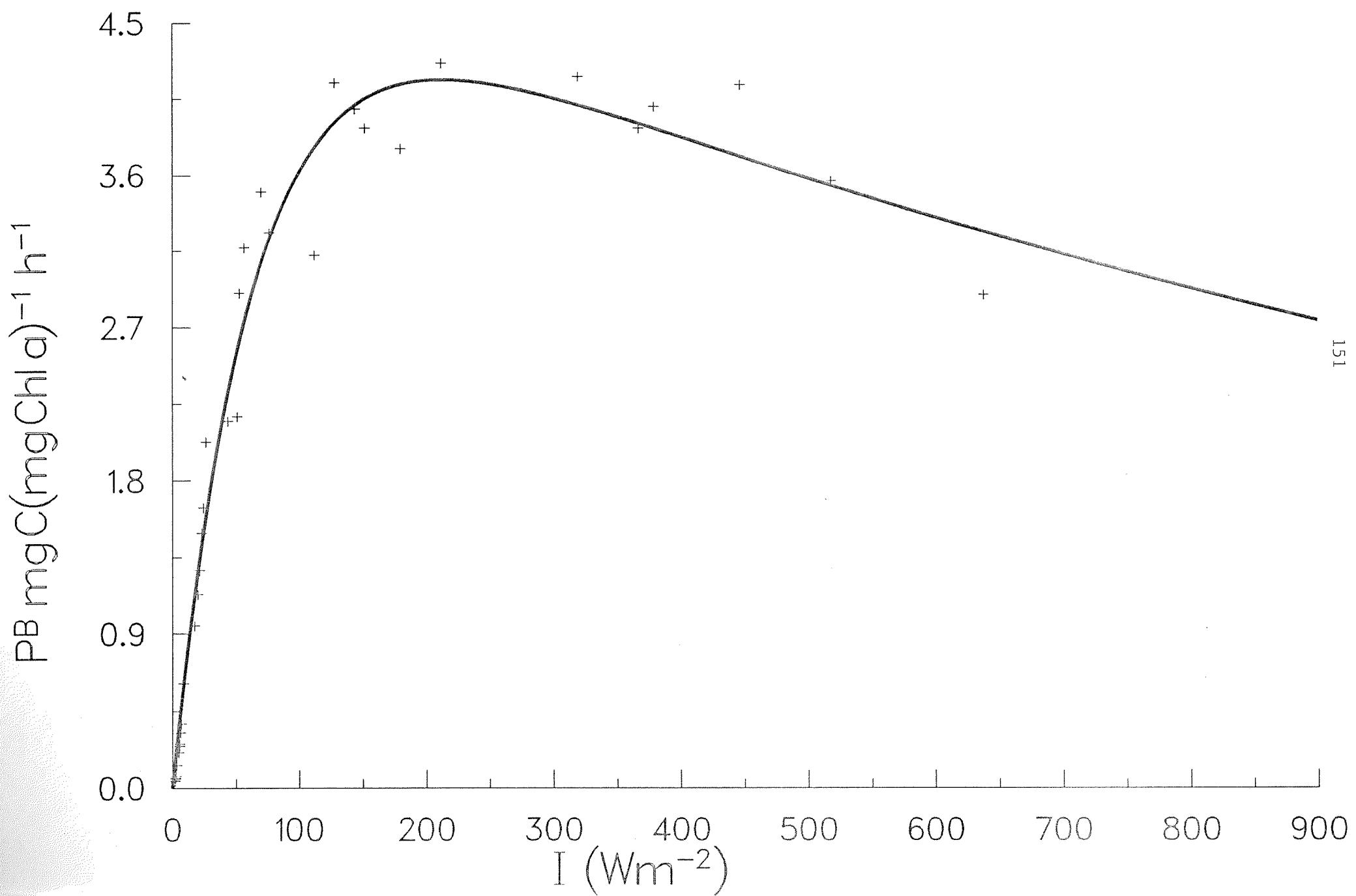
ID 016315>5 STA. 2 30/05/86 15 M



ID 016316<5 STA. 2 30/05/86 15 M

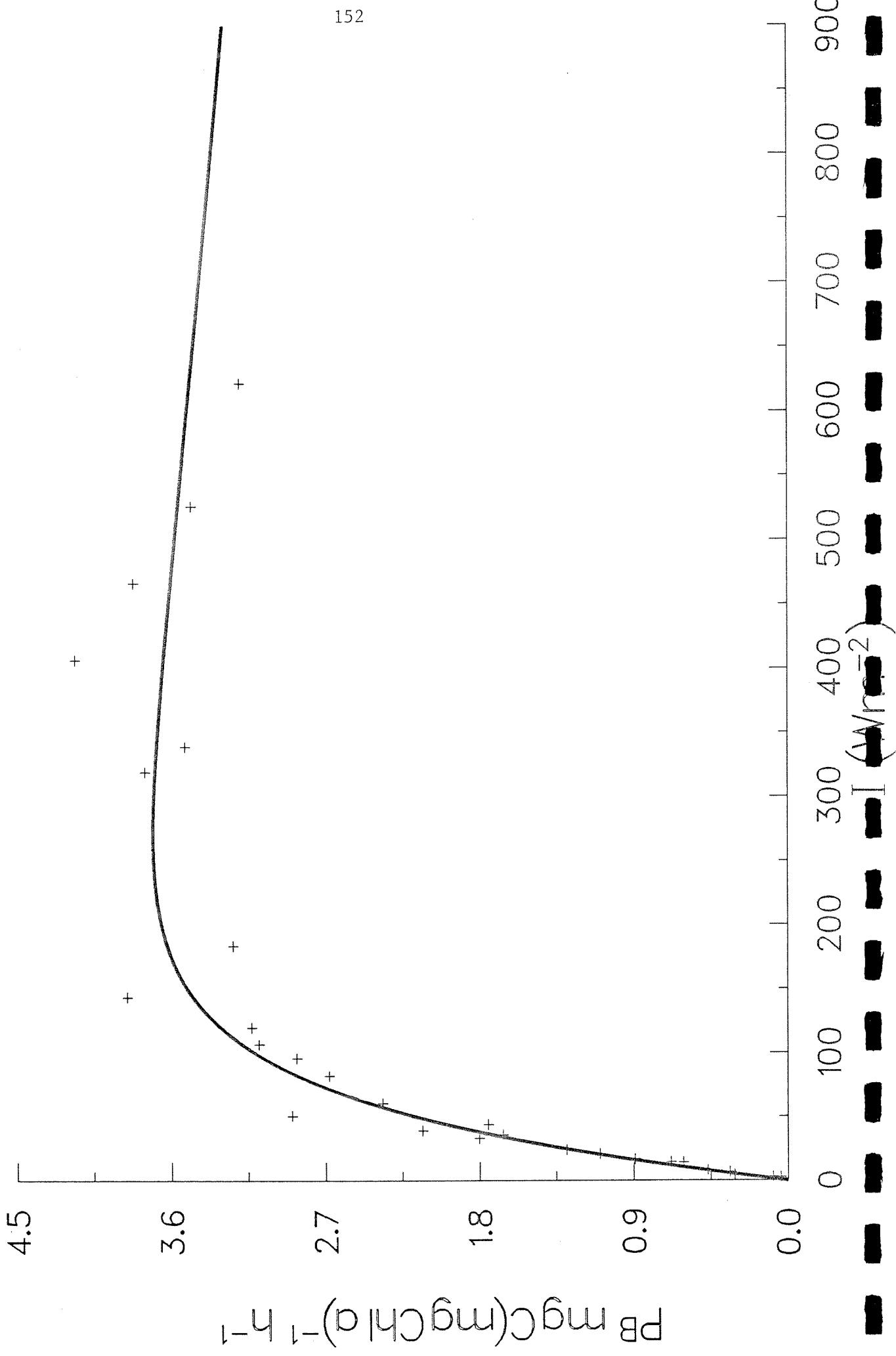


ID 016325W STA. 2 30/05/86 20 M

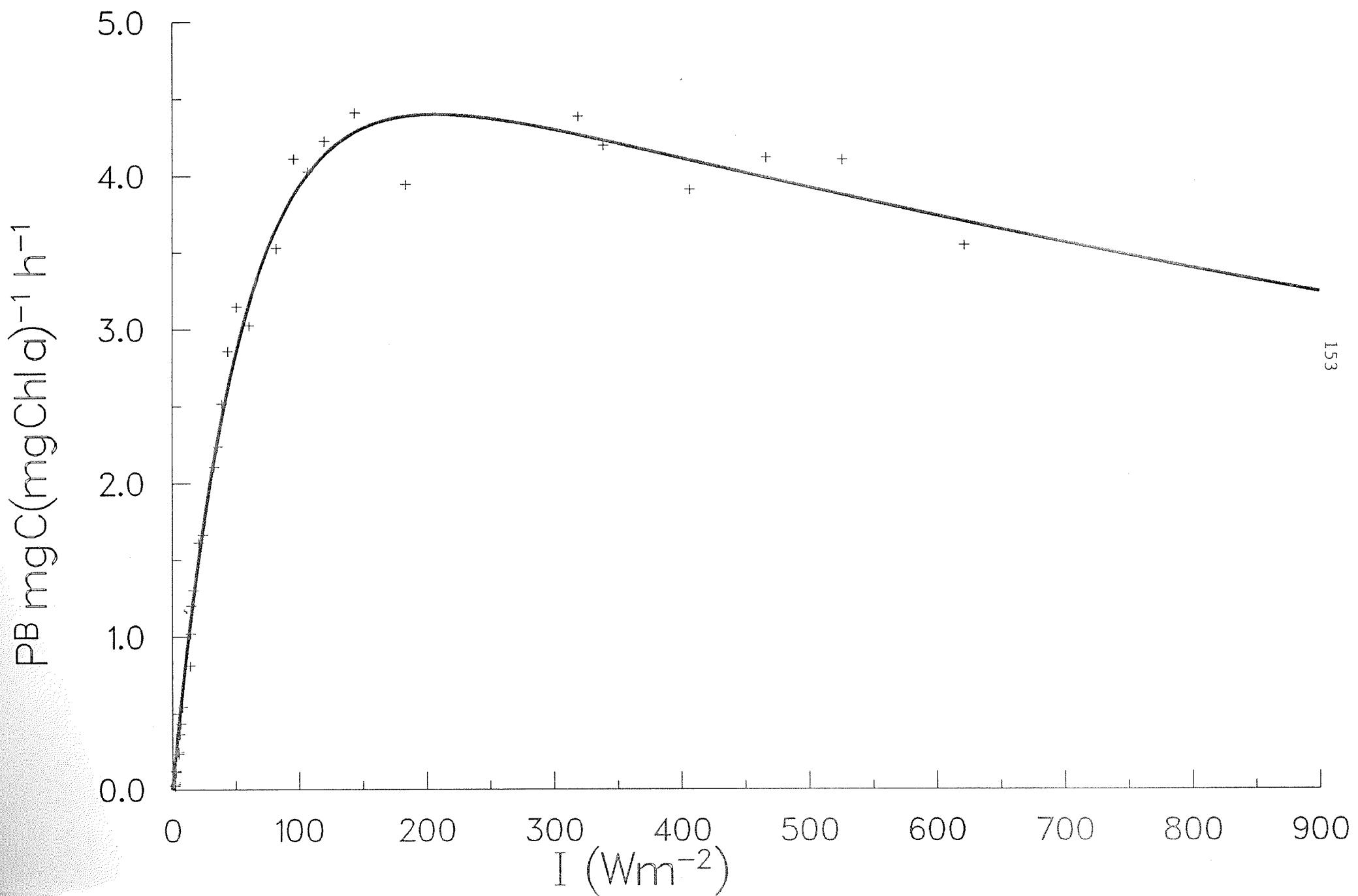


ID 016326>5 STA. 2 30/05/86 20 M

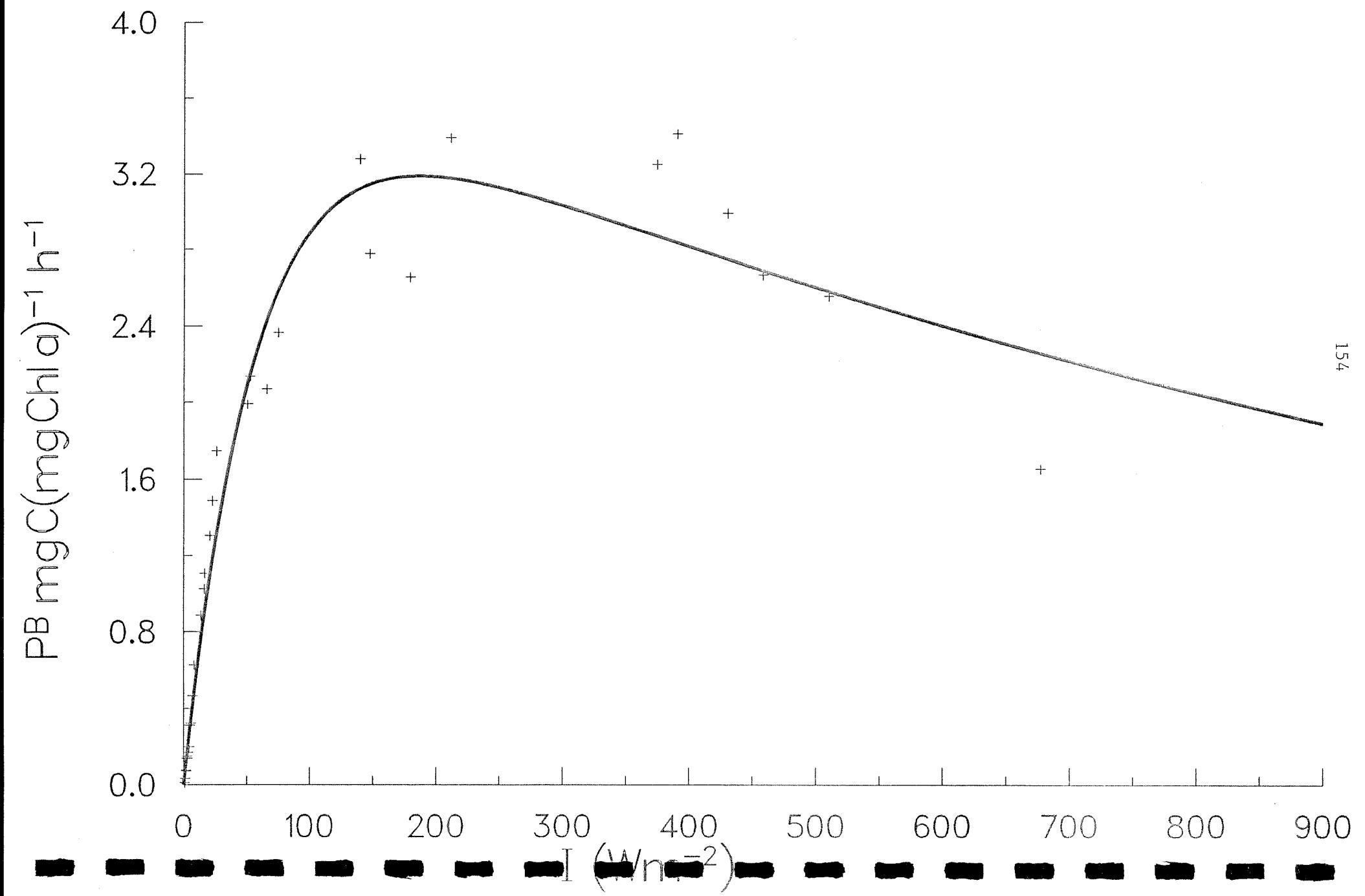
152



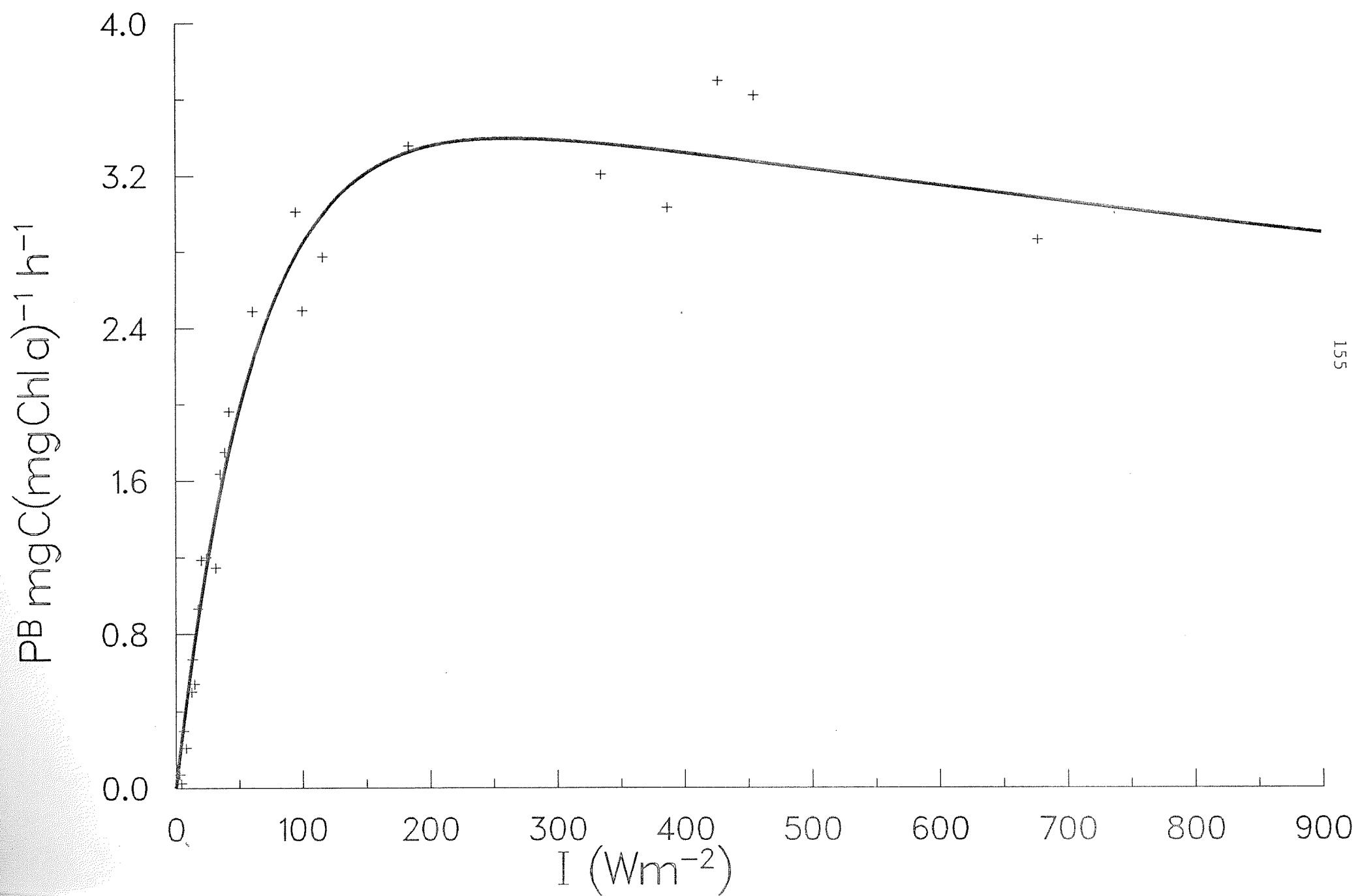
ID 016327<5 STA. 2 30/05/86 20 M



ID 016344W STA. 2 31/05/86 25 M

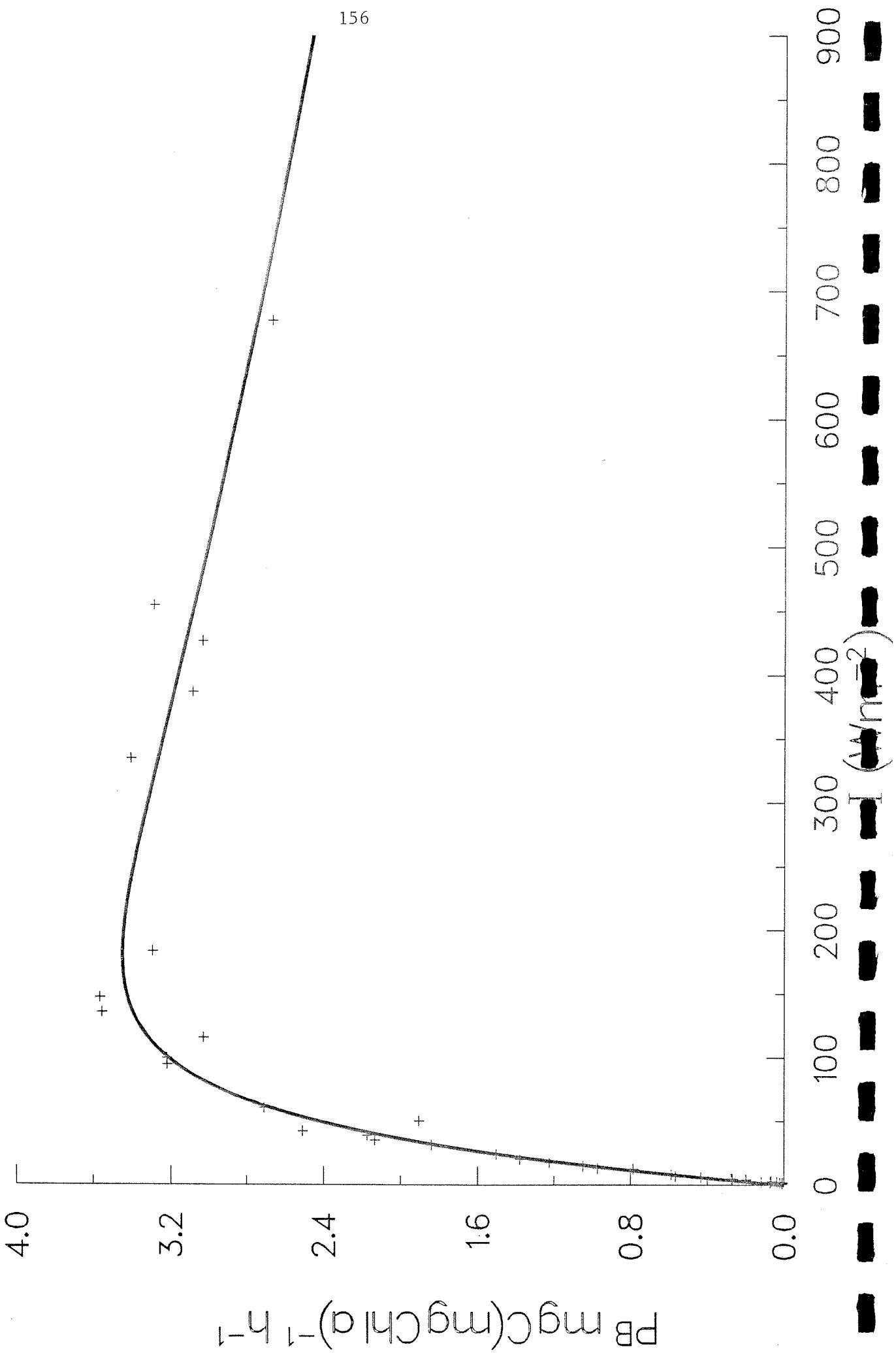


ID 016345>5 STA. 2 31/05/86 25 M

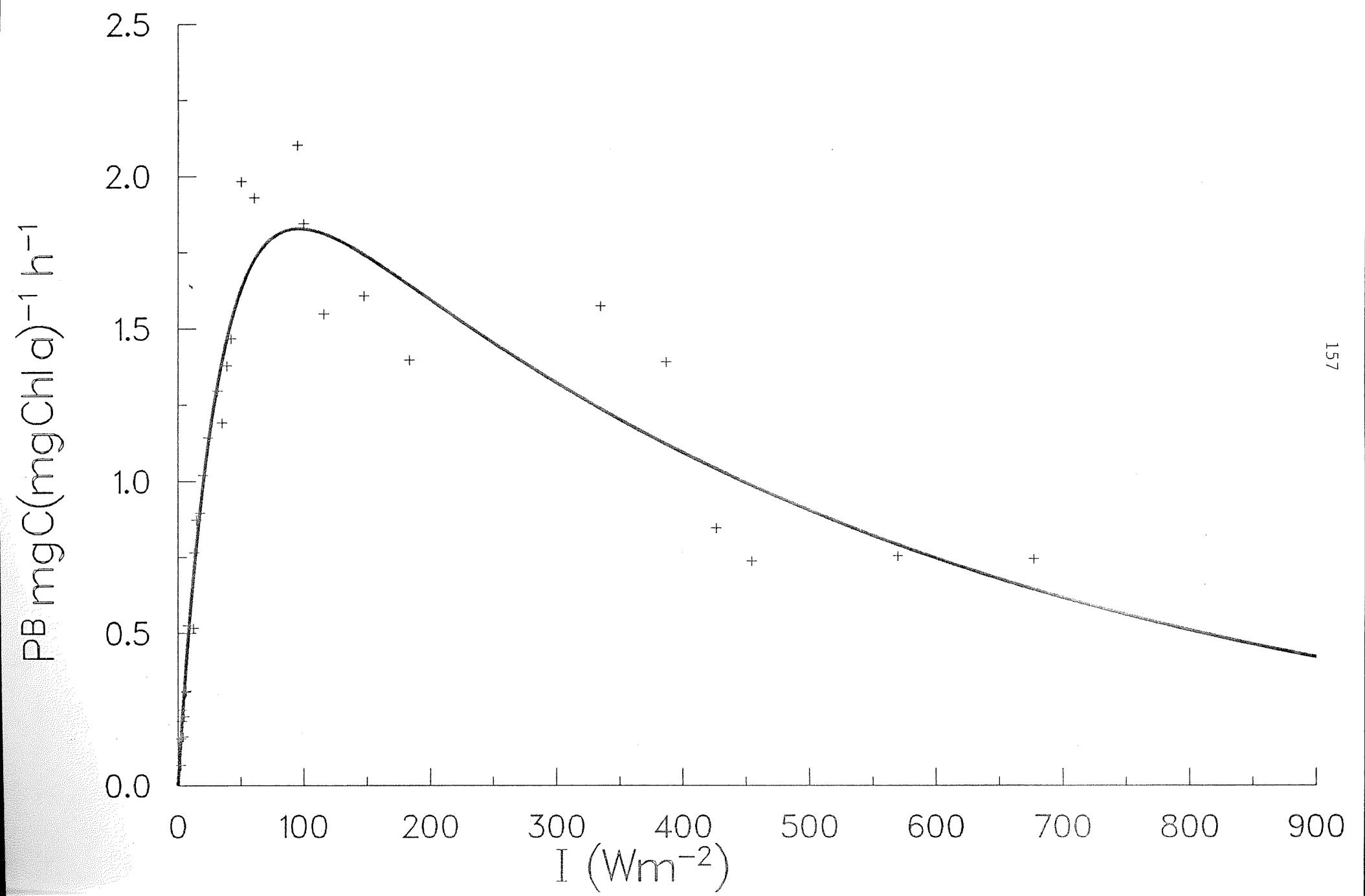


ID 016346<5 STA. 2 31/05/86 25 M

156

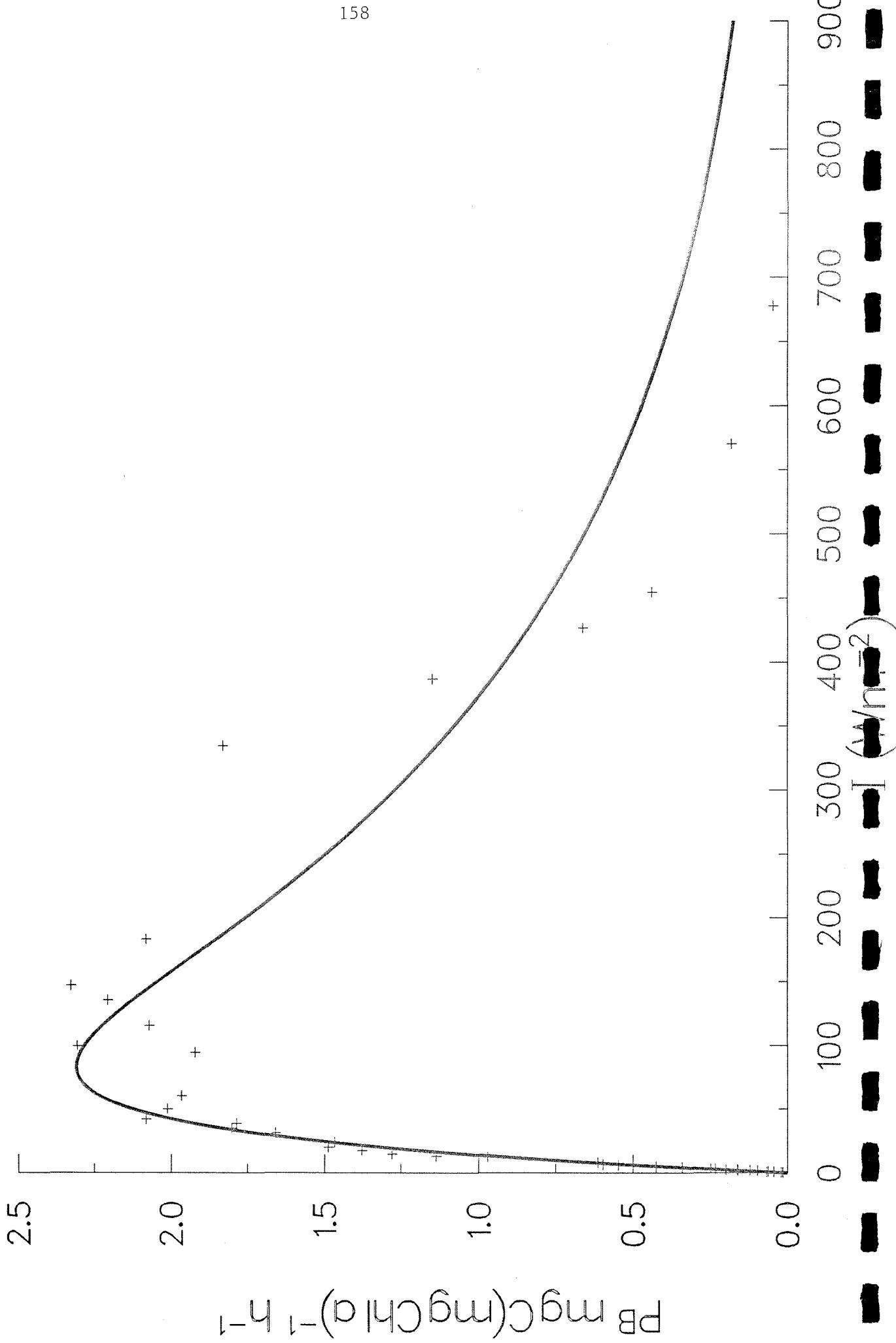


ID 016356>5 STA. 2 31/50/86 35 M

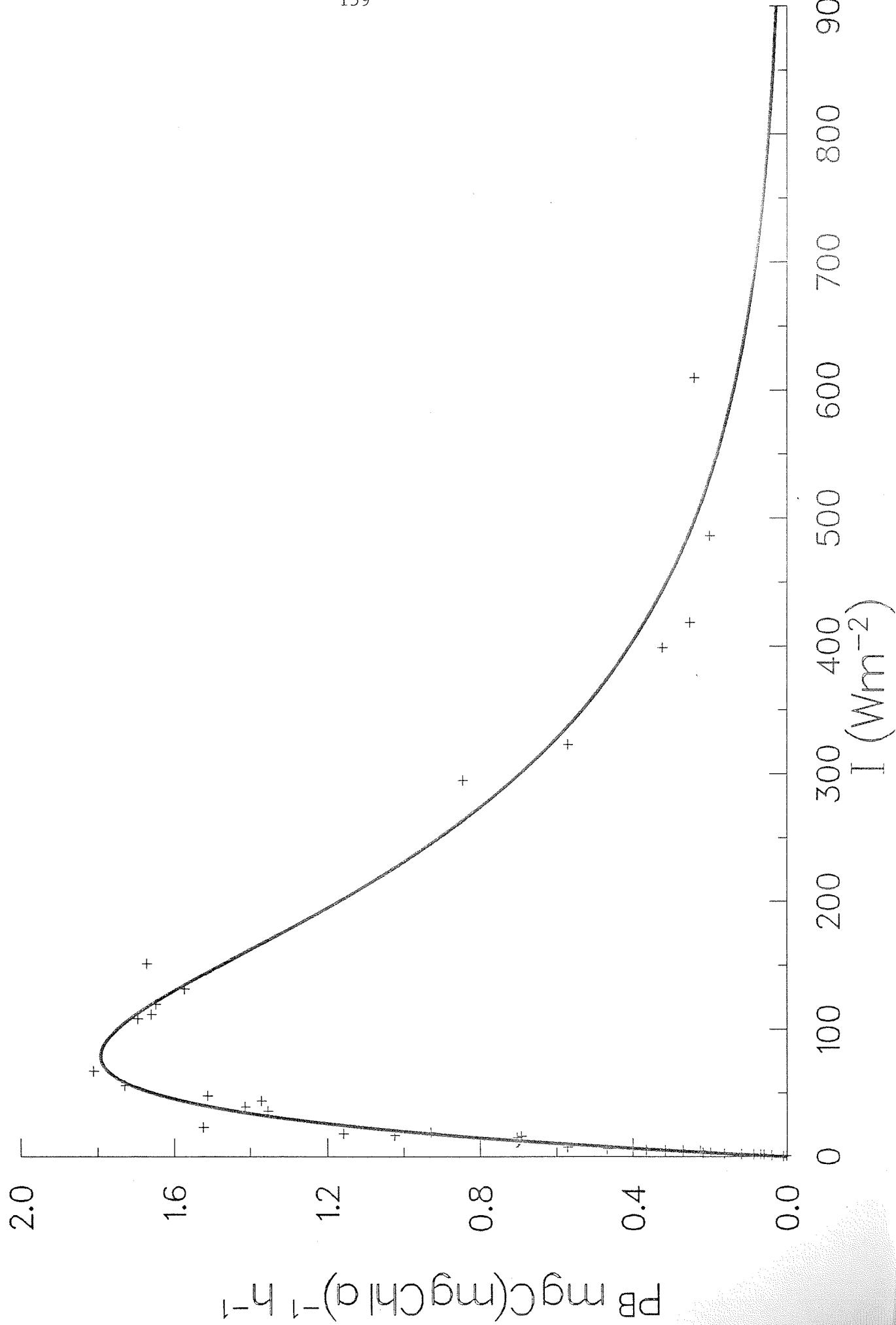


ID 016357<5 STA. 2 31/05/86 35 M

158

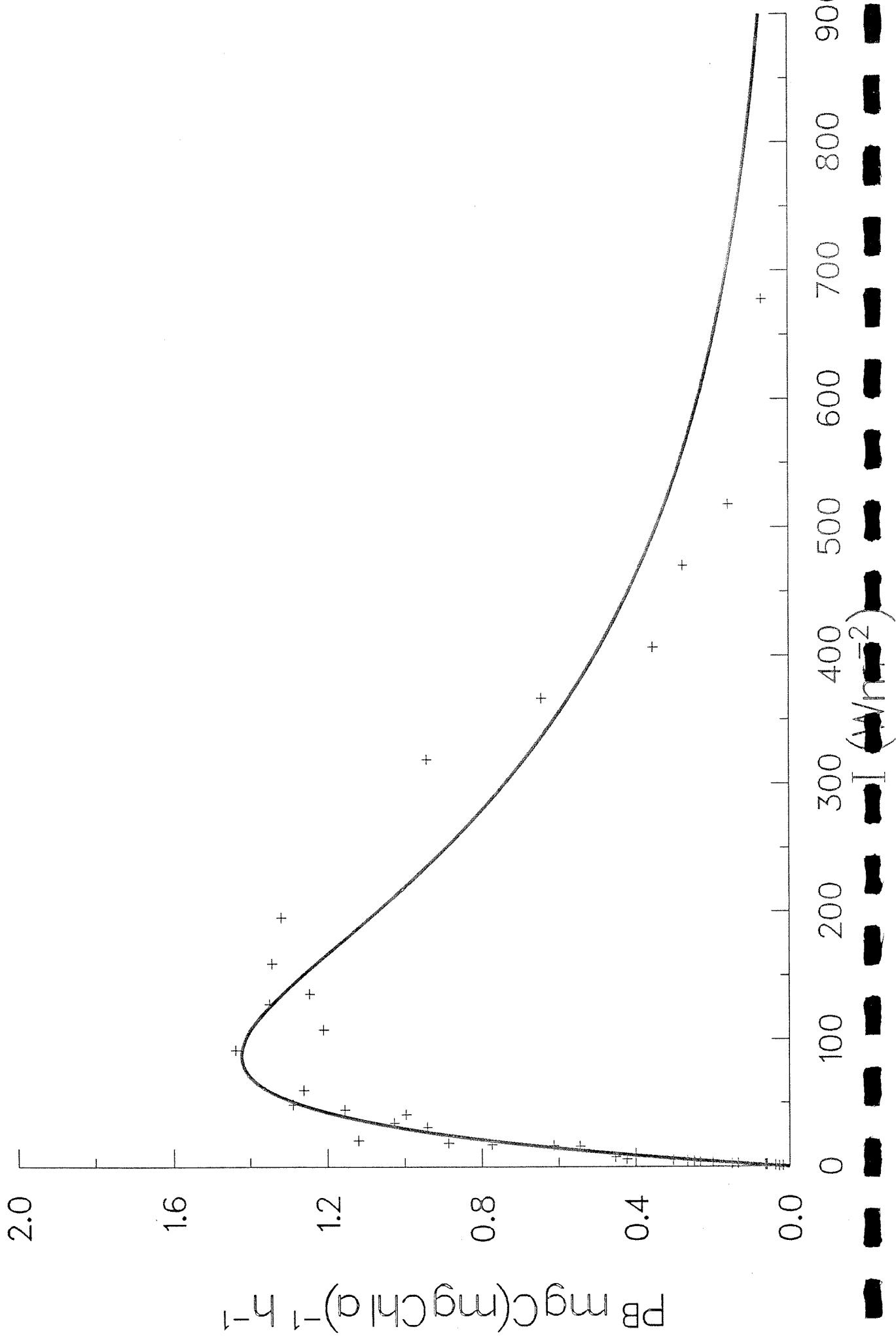


ID 016372W STA. 2 1/06/86 35 M

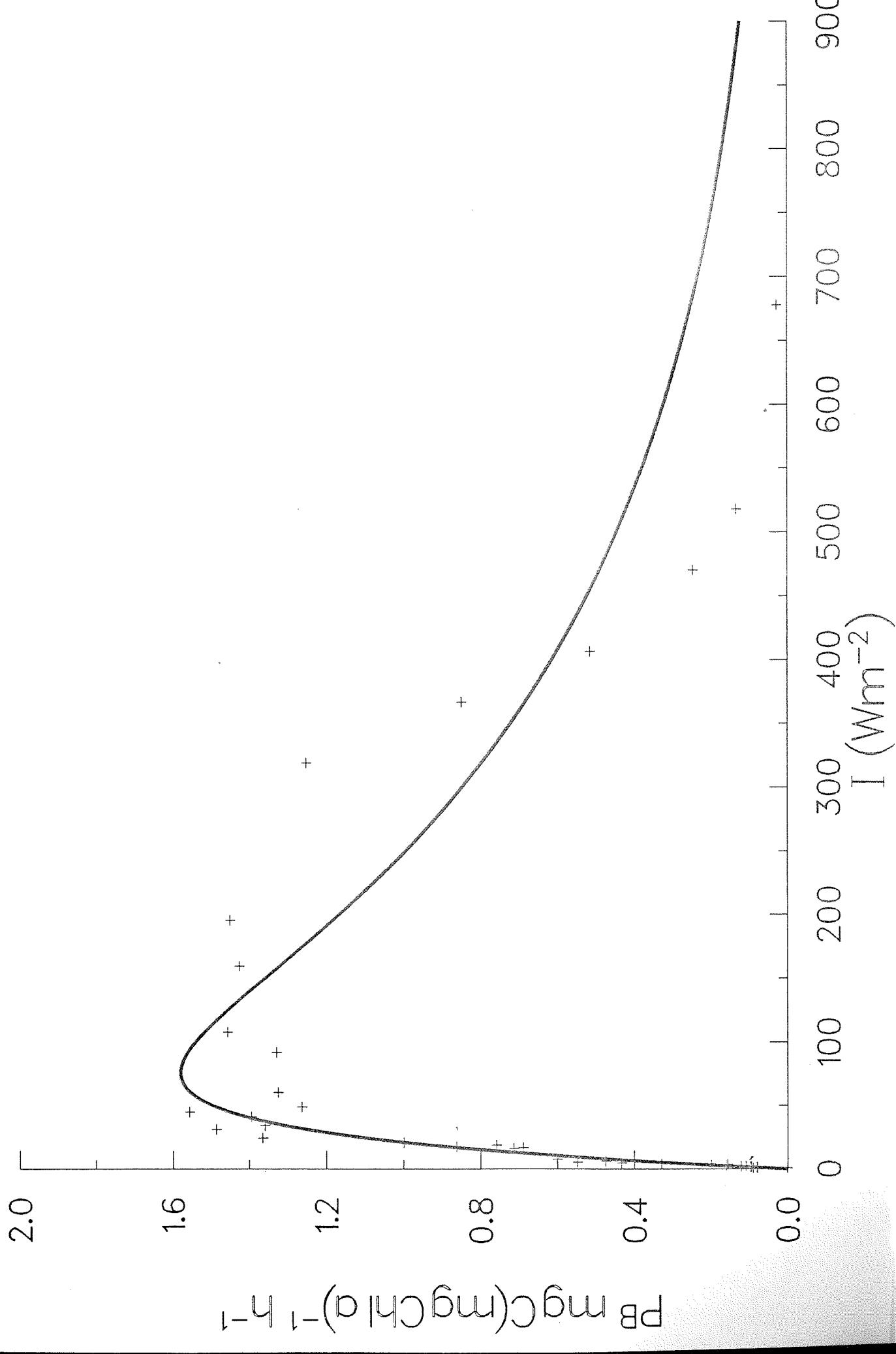


ID 016373>1 STA. 2 1/06/86 35 M

160

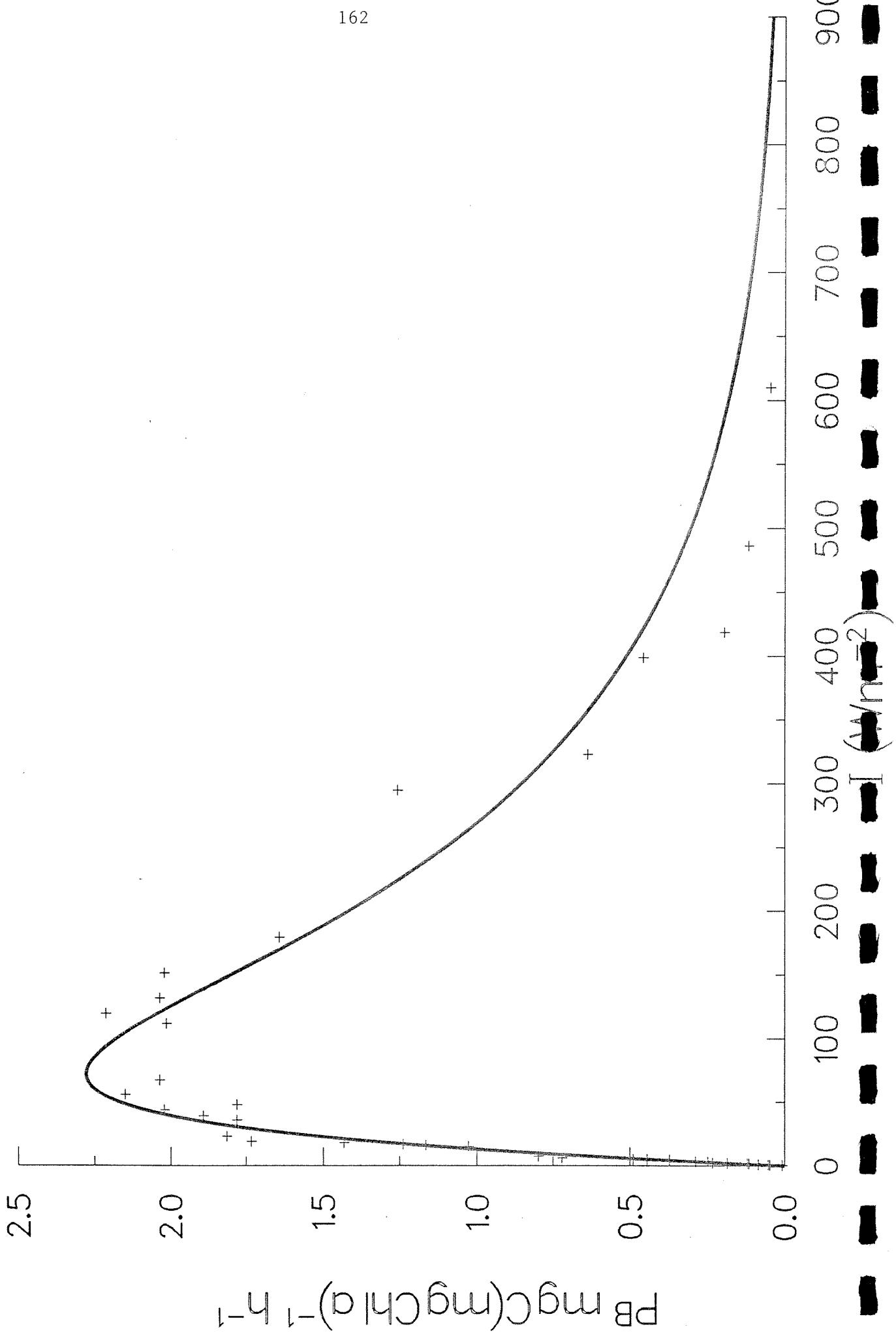


ID 016374<1 STA. 2 1/06/86 35 M

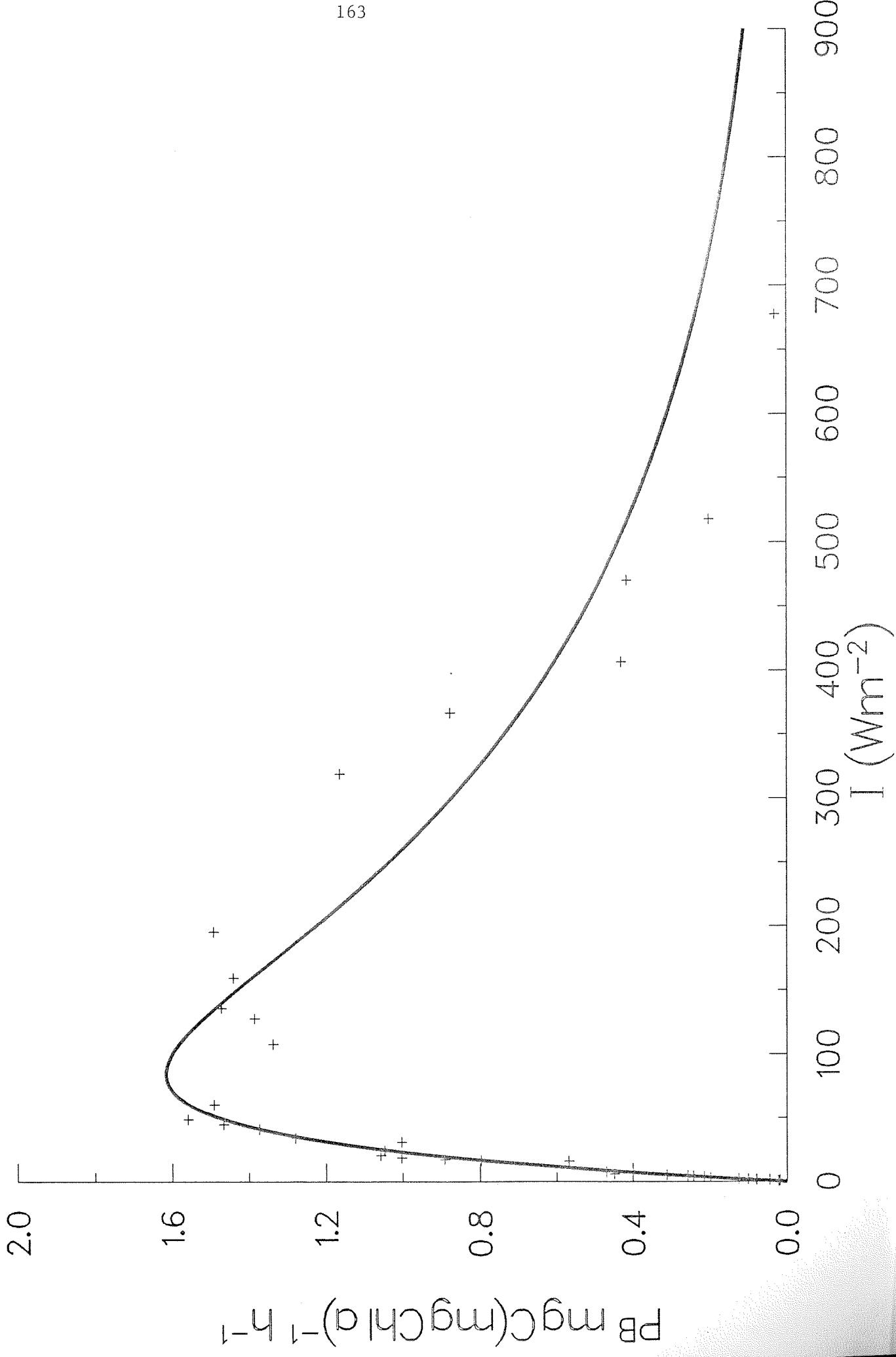


ID 016391W STA. 2 1/06/86 30 M

162

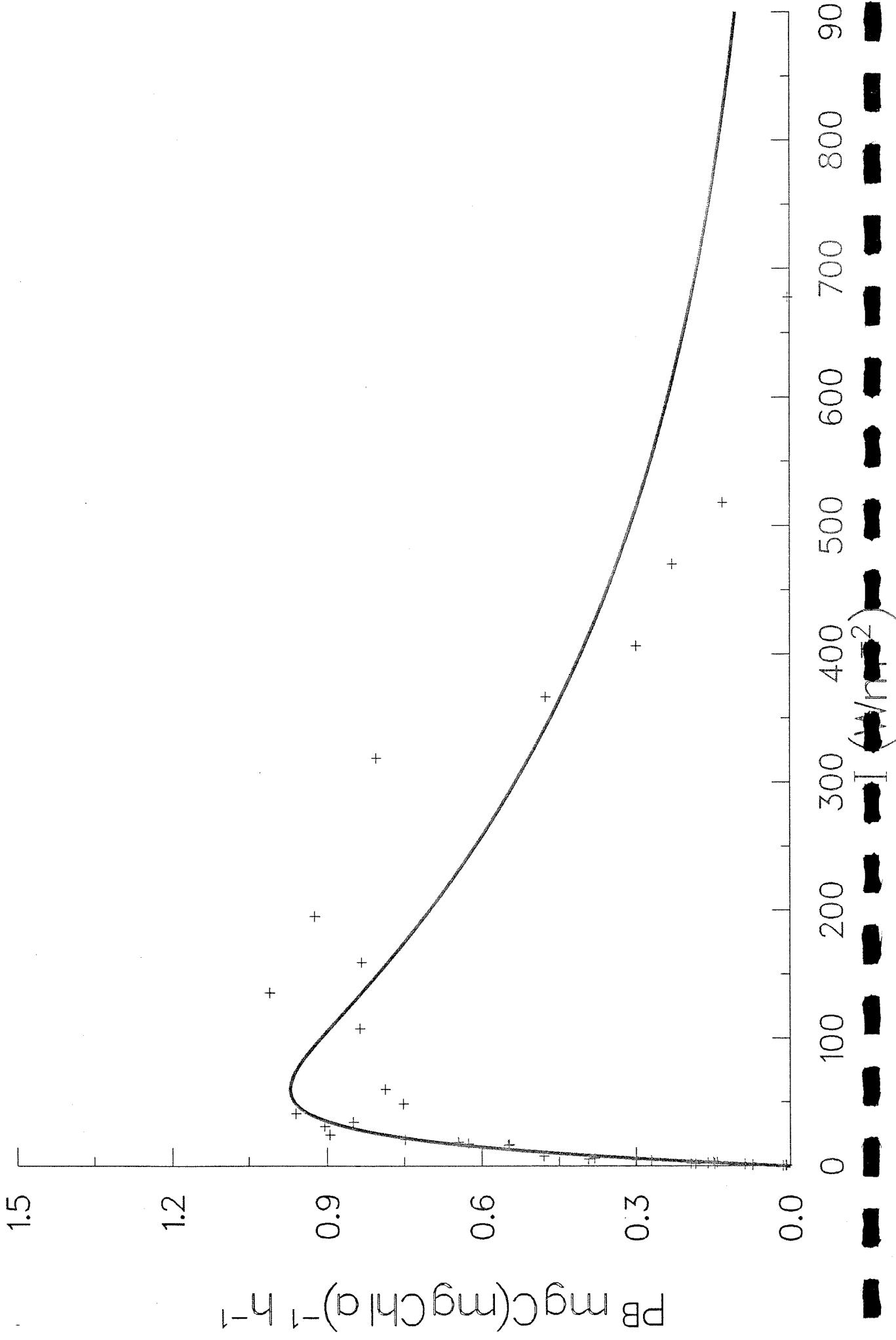


ID 016392>1 STA. 2 1/06/86 30 M

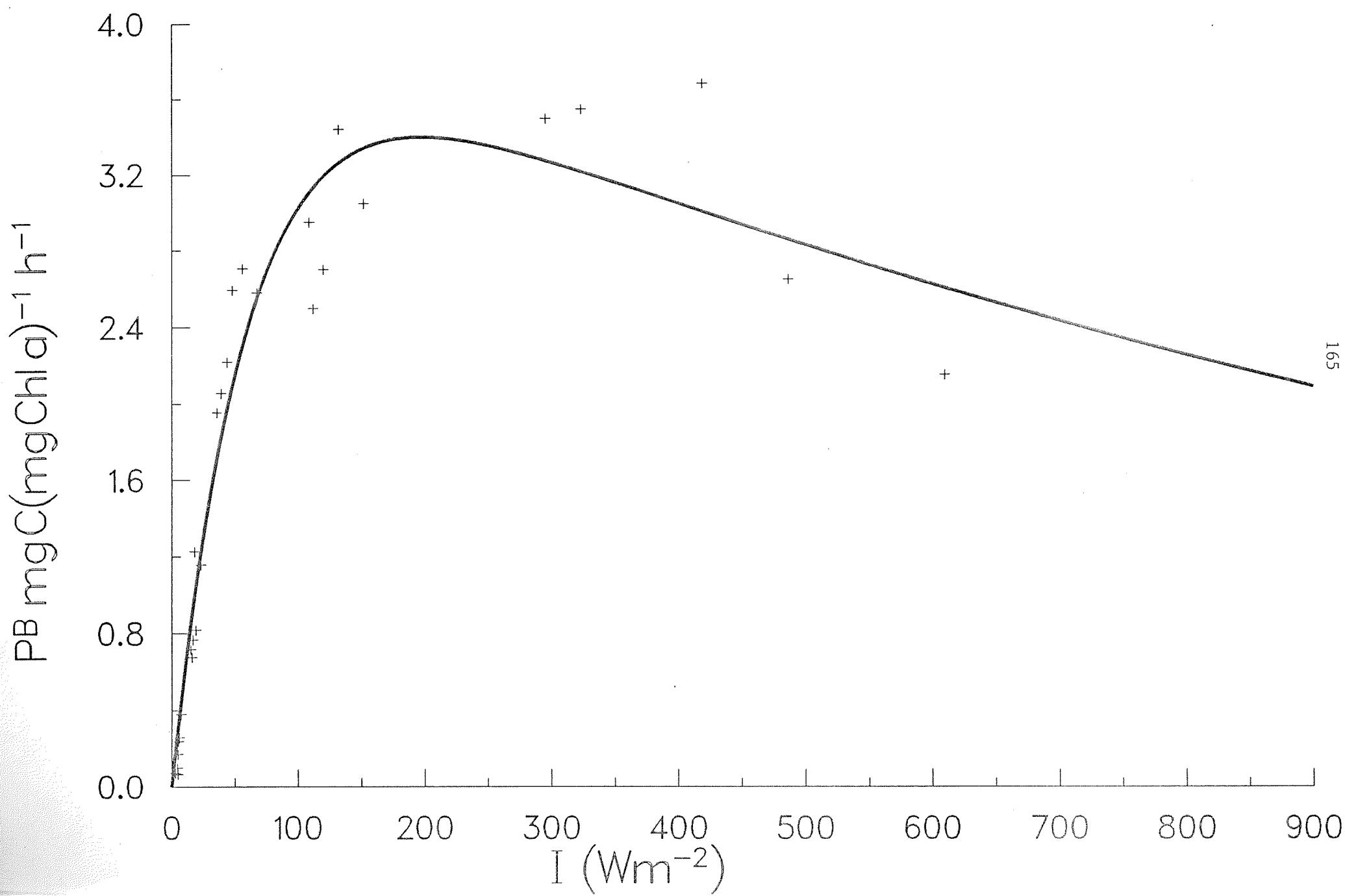


D 016393<1 STA. 2 1/06/86 30 M

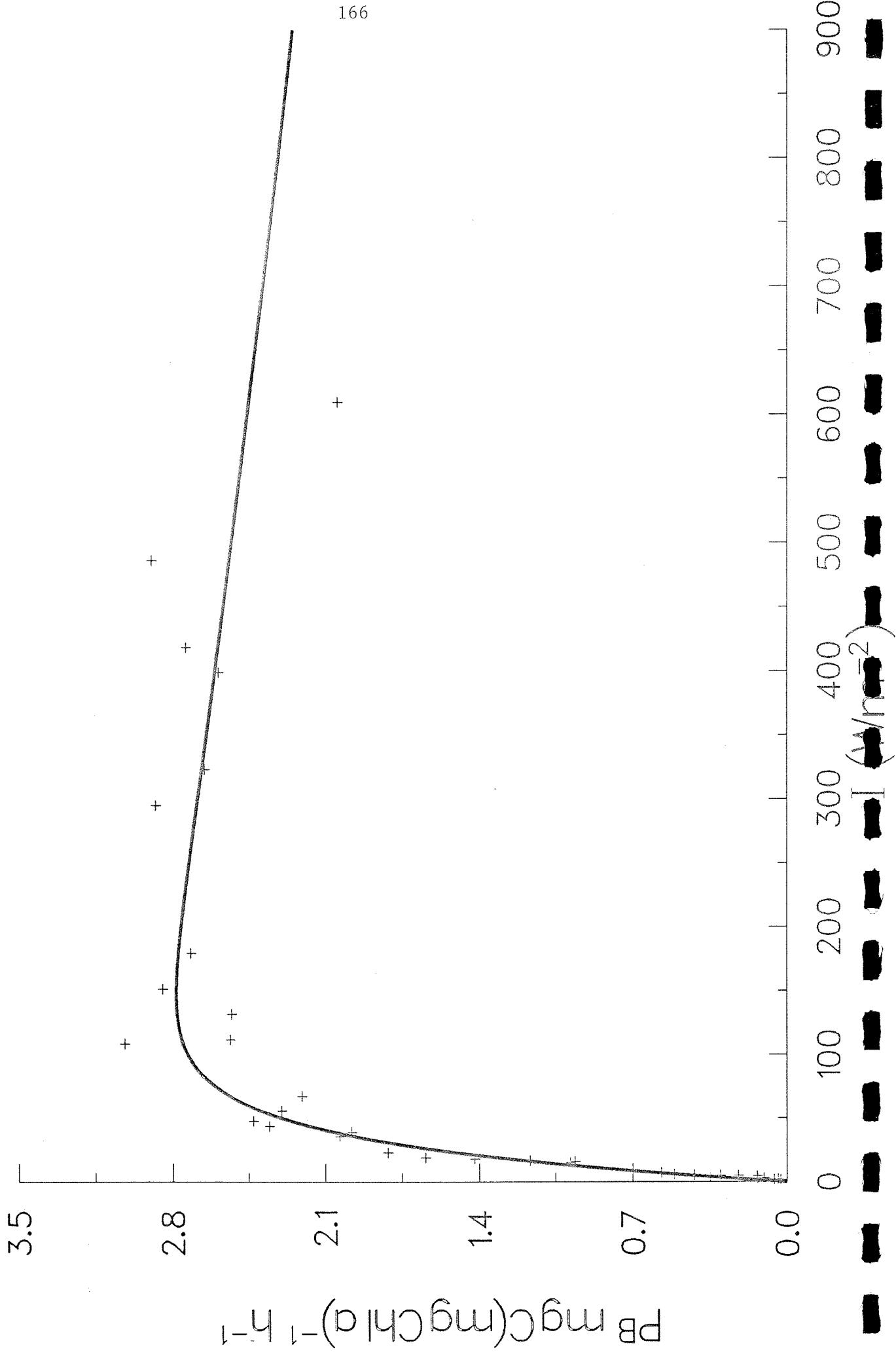
164



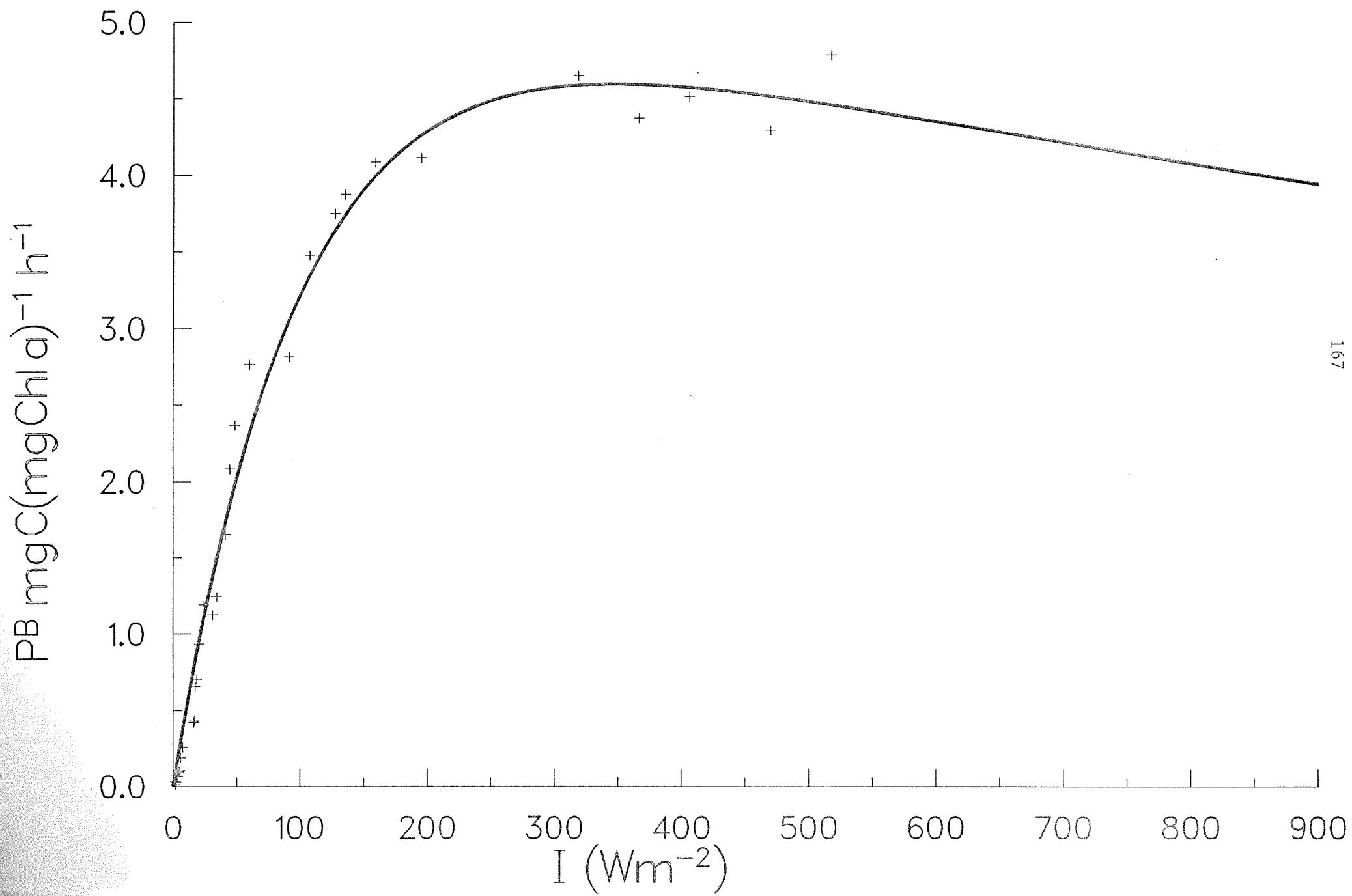
ID 016503>1 STA. 2 2/06/86 20 M



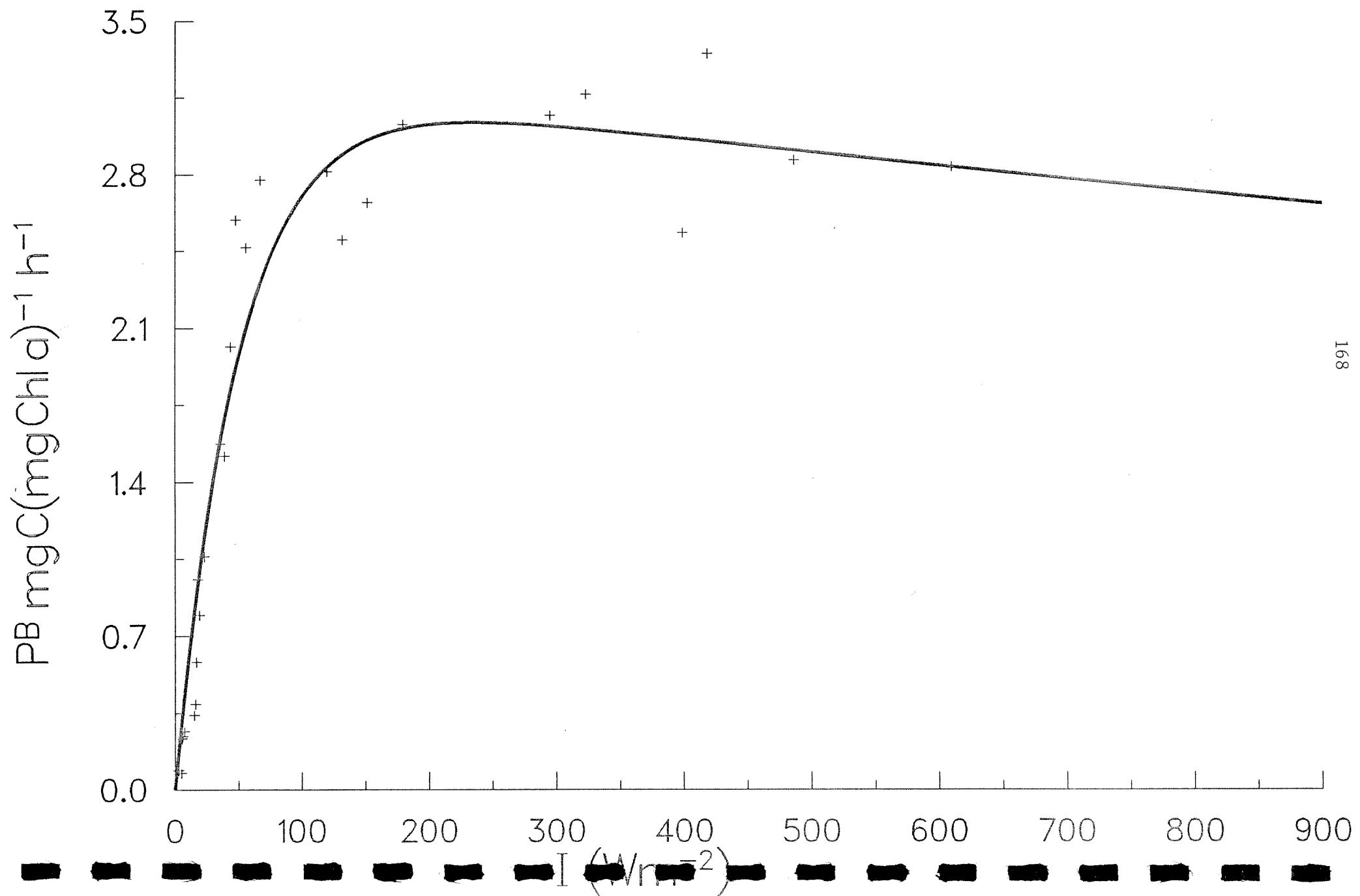
ID 016504<1 STA. 2 2/06/86 20 M



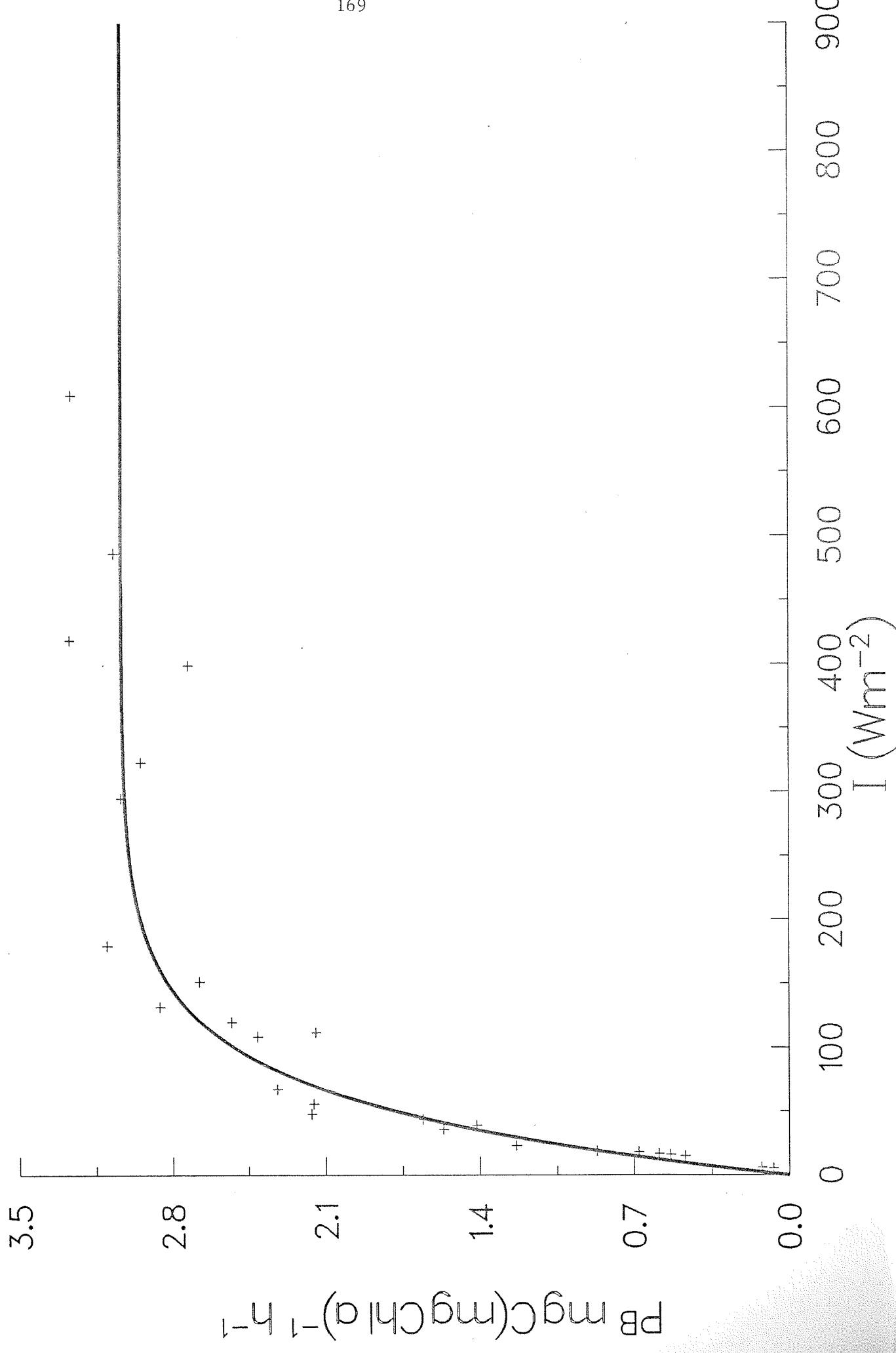
ID 016513W STA. 2 2/06/86 10 M



ID 016514>1 STA. 2 2/06/86 10 M

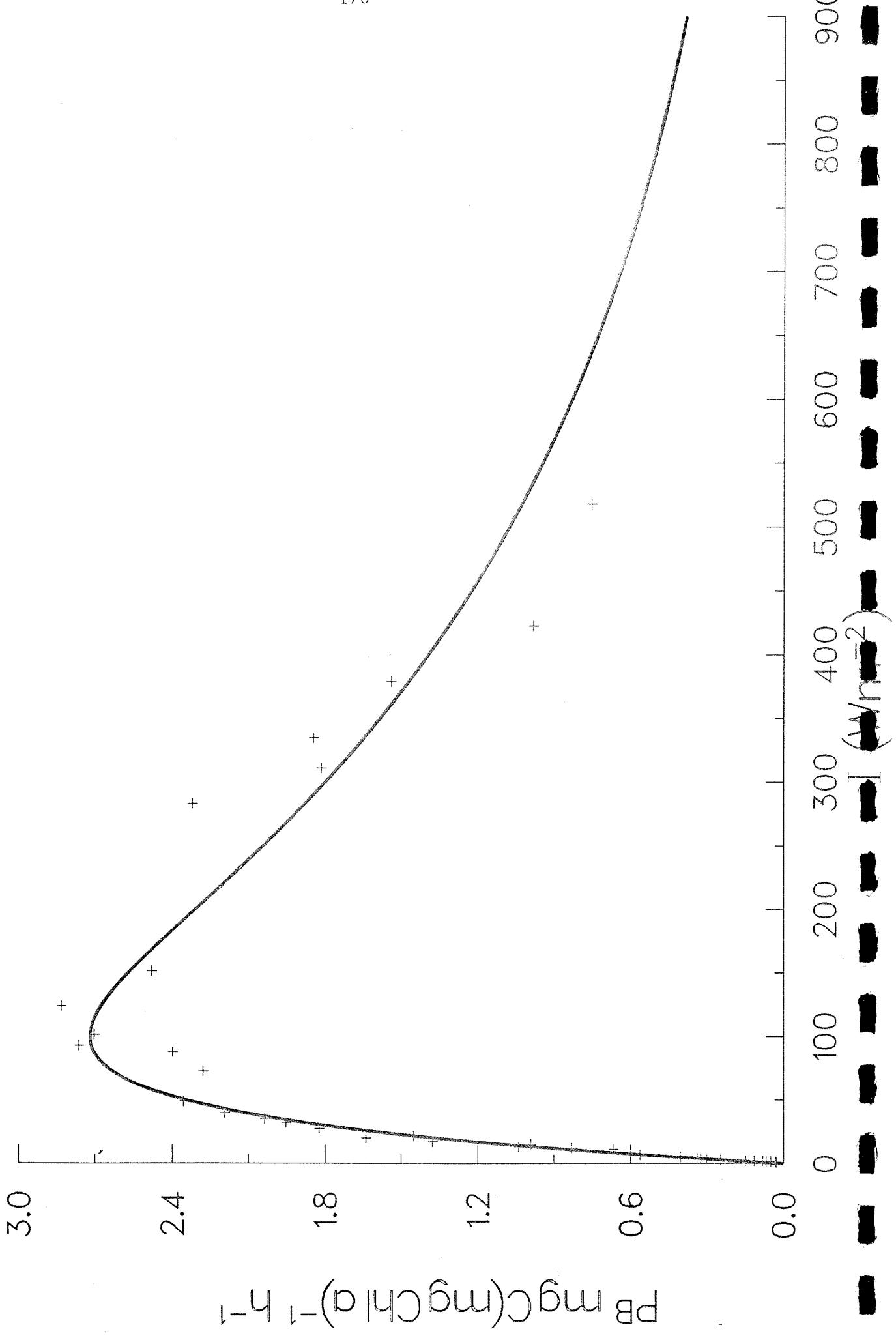


ID 016515<1 STA. 2 2/06/86 10 M



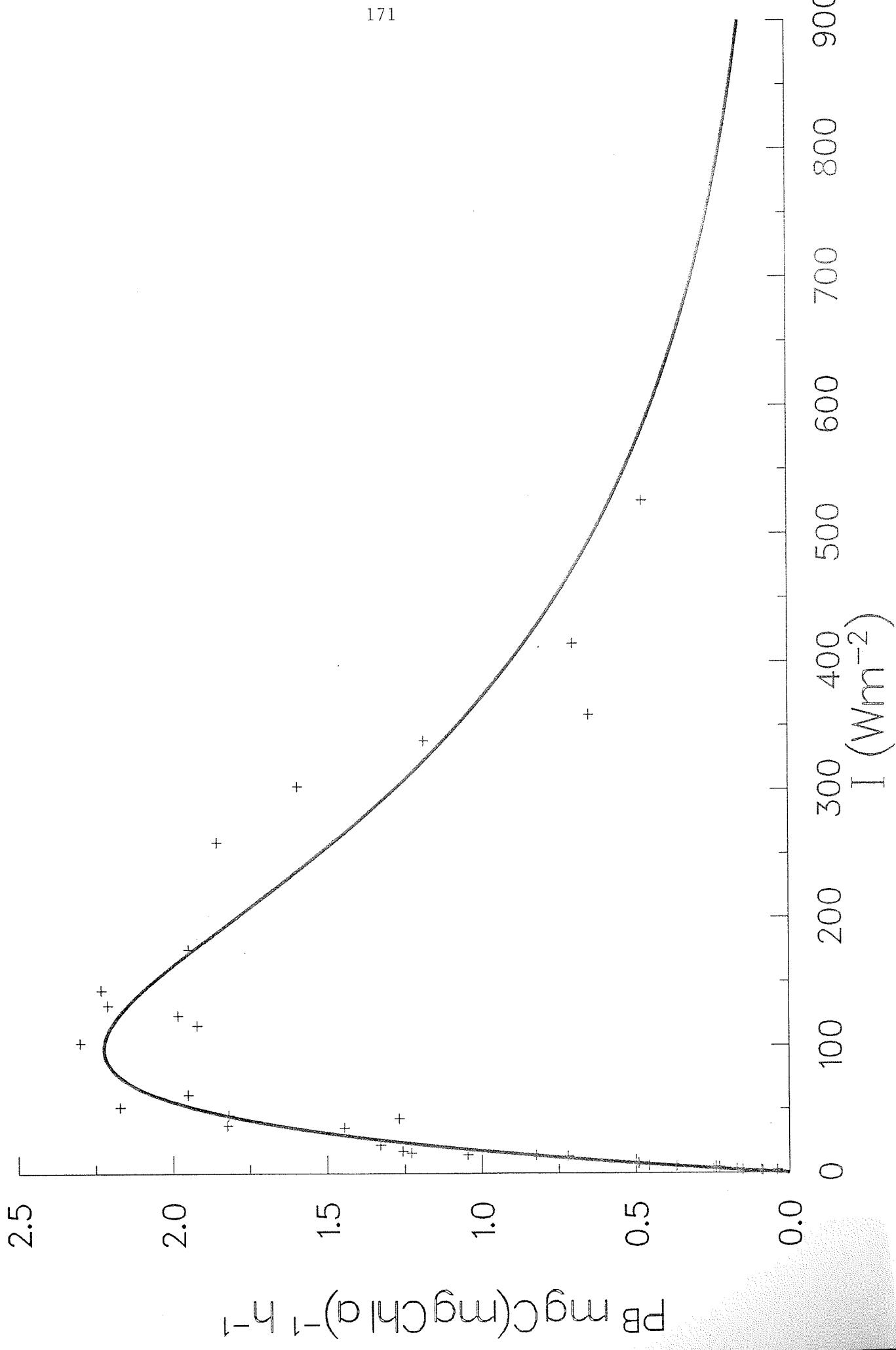
ID 016518W STA. 2 3/06/86 25 M

170



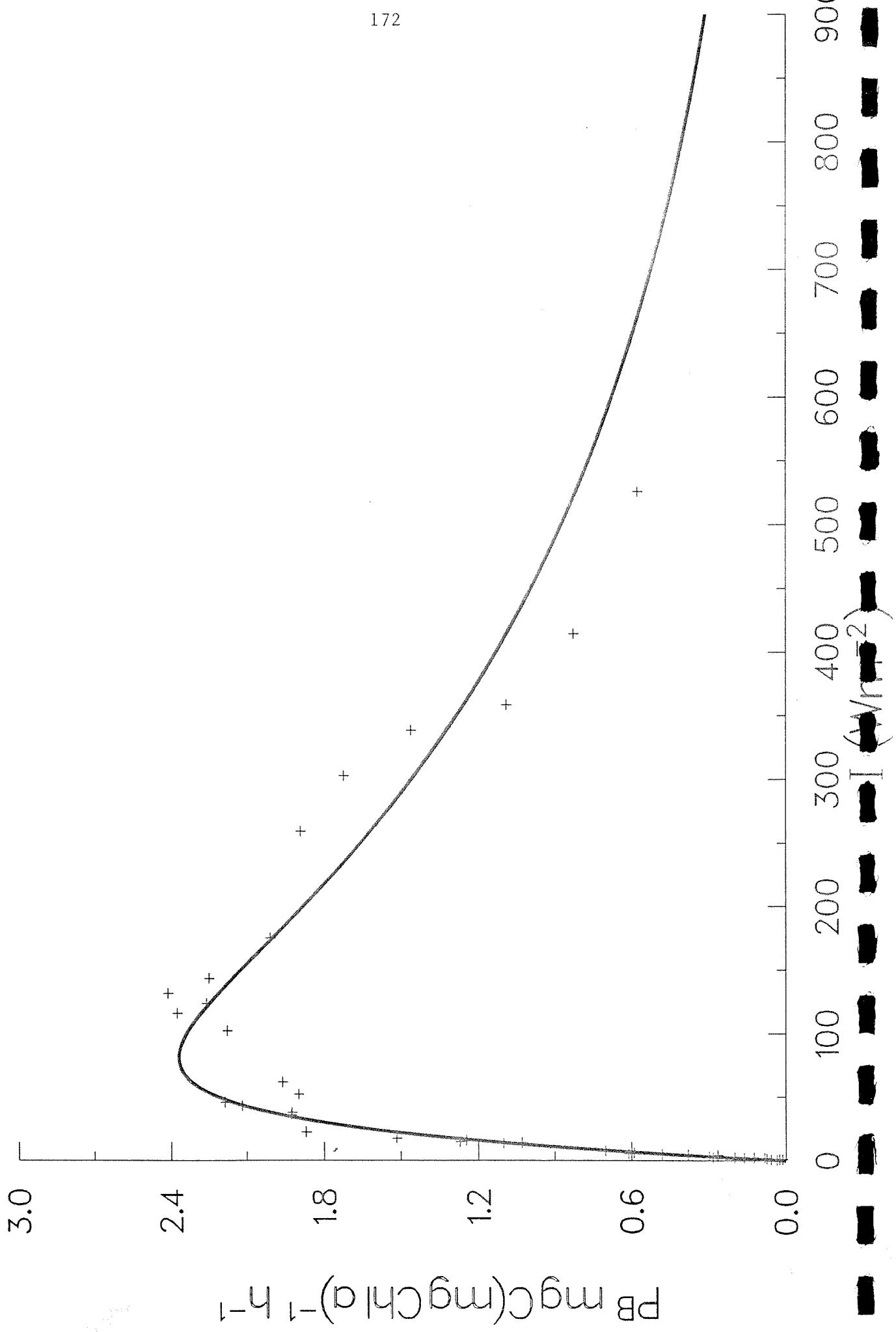
ID 016519>1 STA. 2 3/06/86 25 M

171

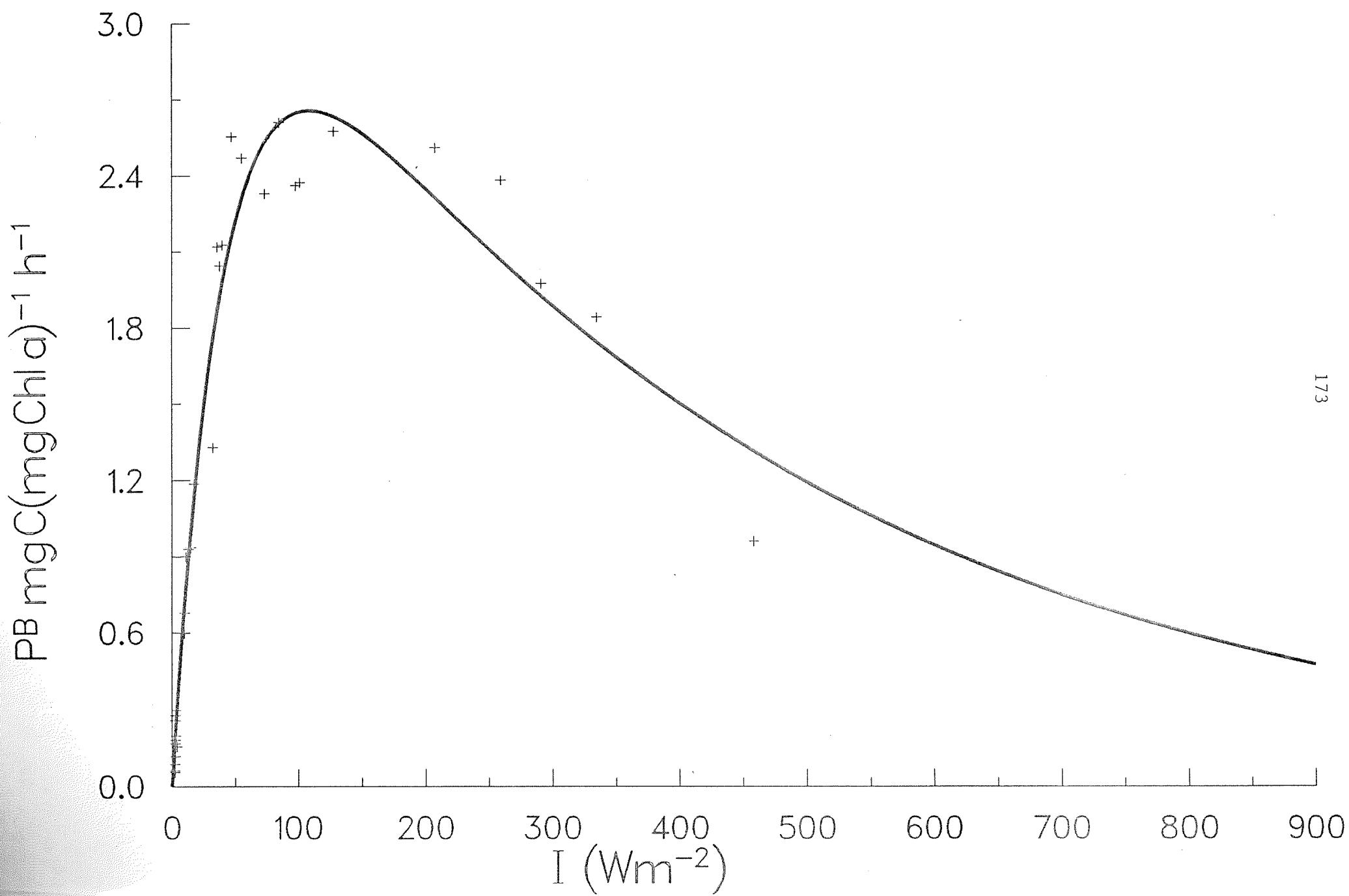


ID 016520<1 STA. 2 3/06/86 25 M

172

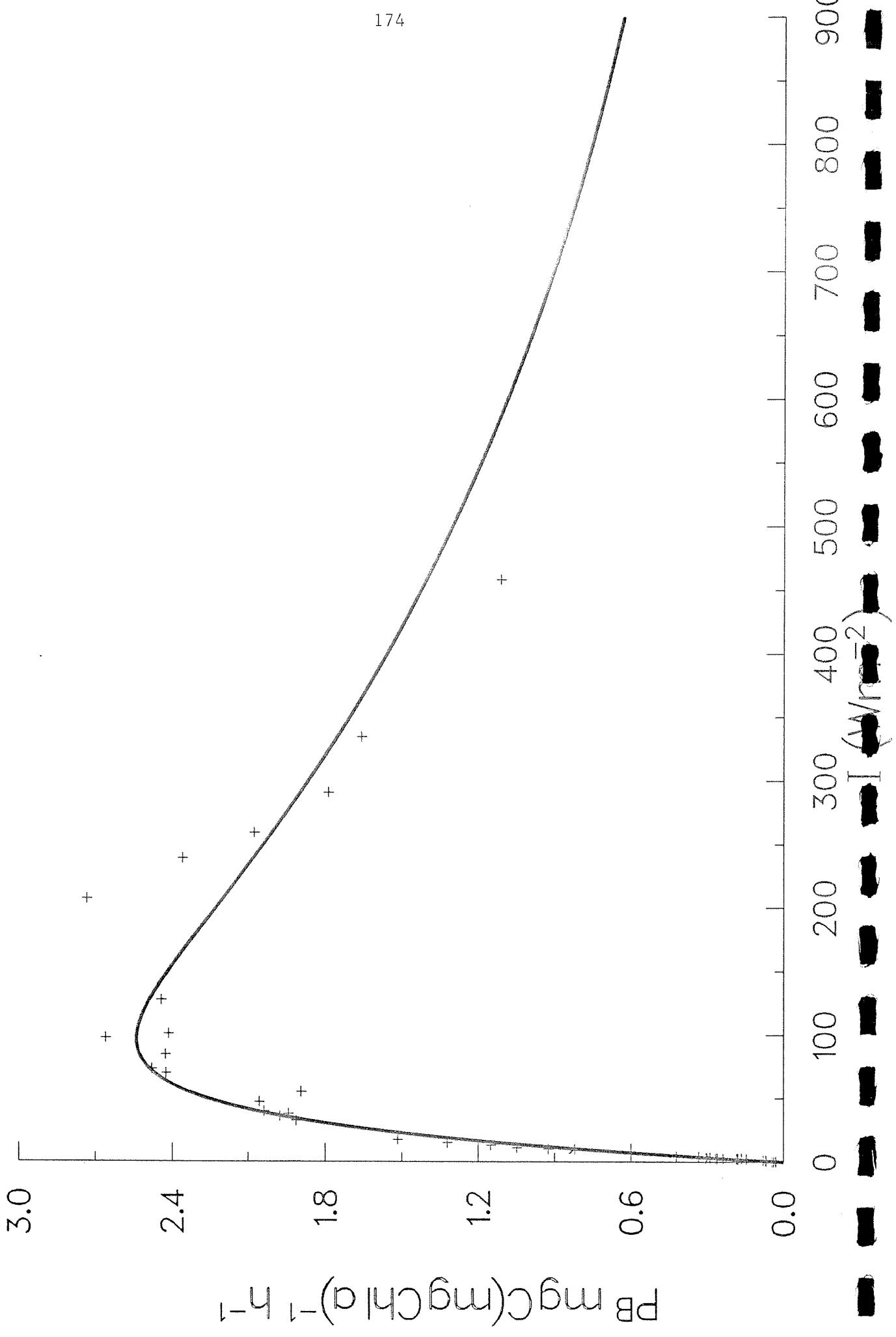


ID 016521>3 STA. 2 3/06/86 25 M



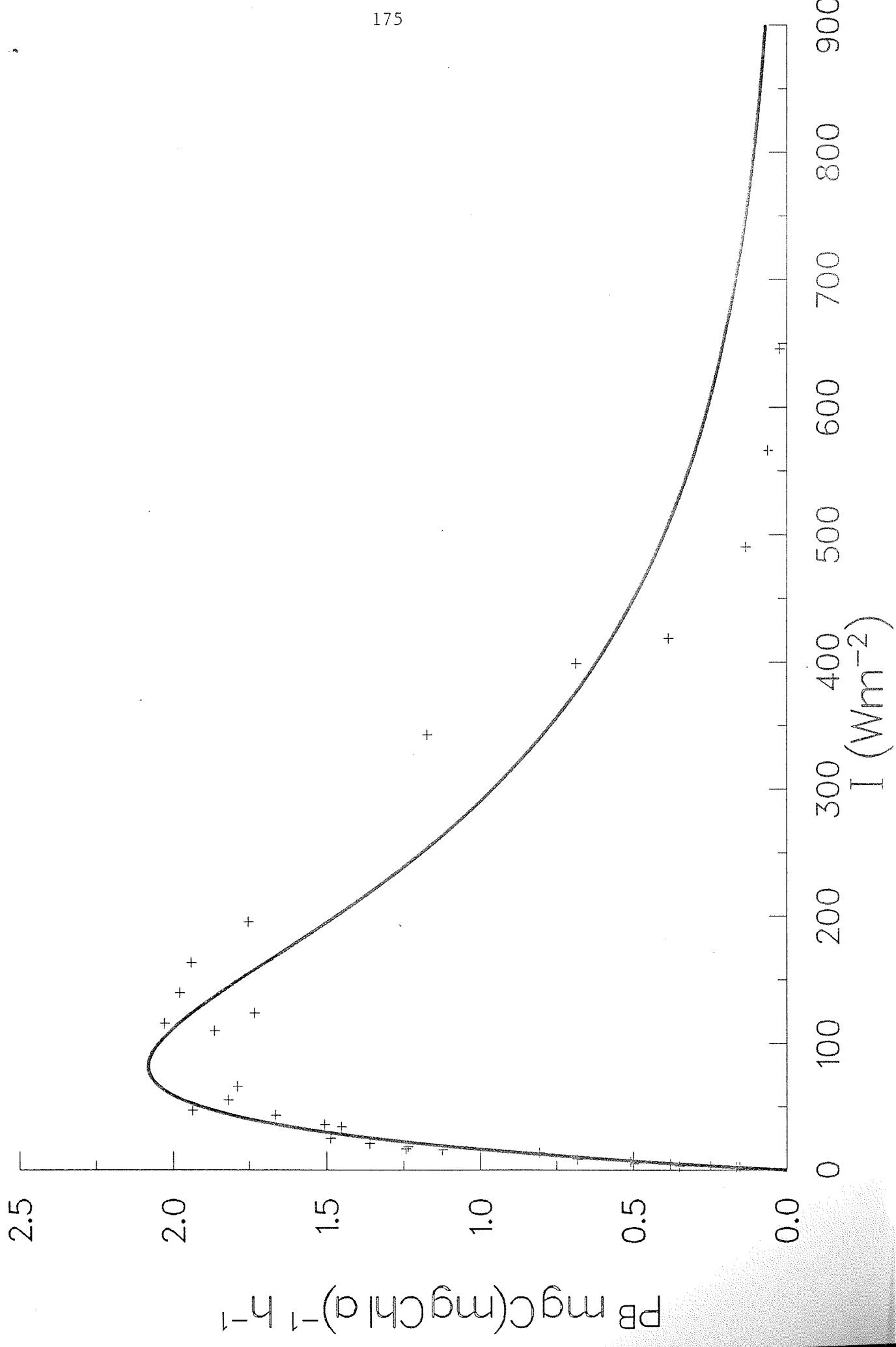
ID 016522<3 STA. 2 3/06/86 25 M

174



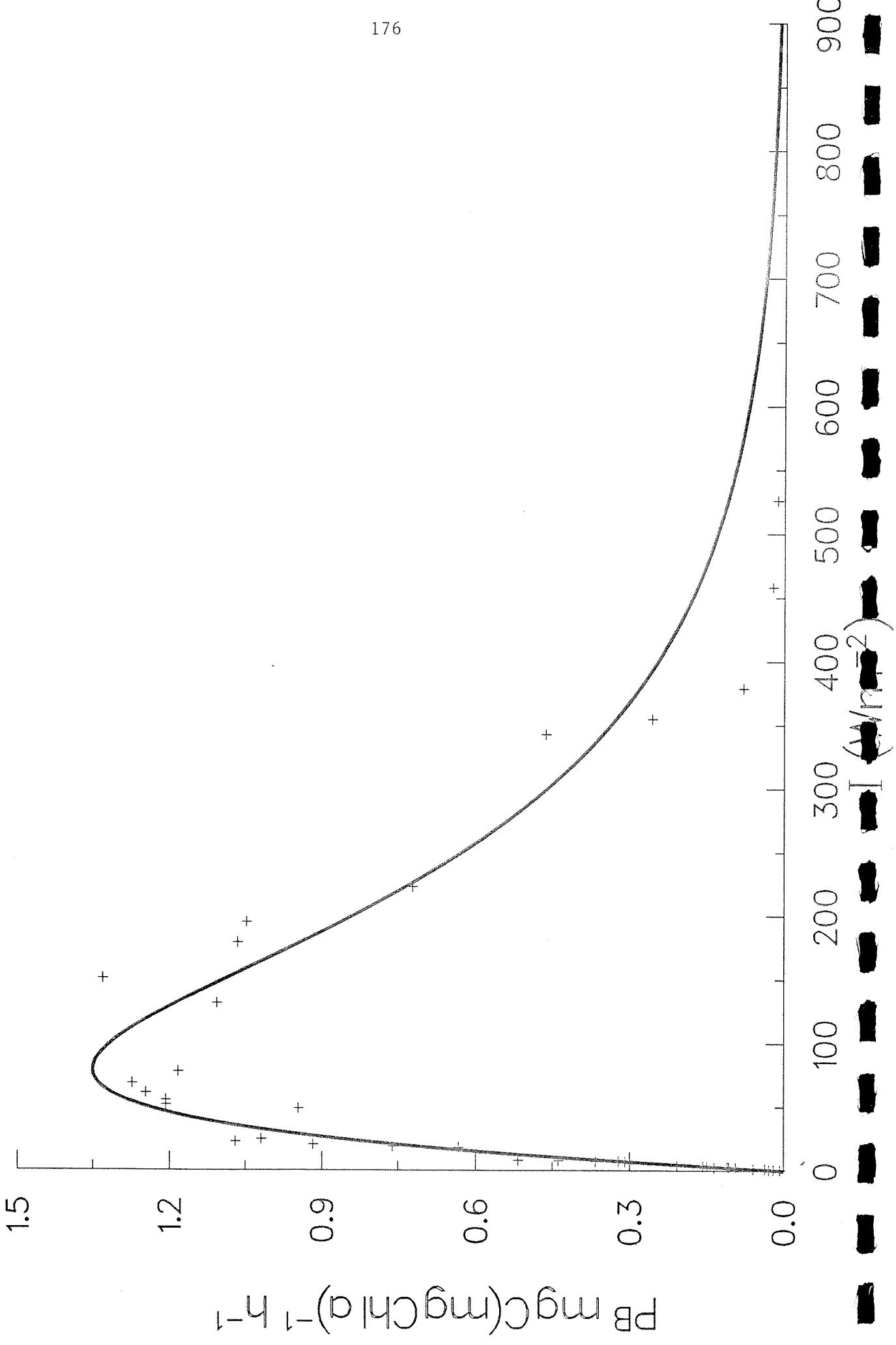
ID 016553W STA. 2 4/06/86 35 M

175



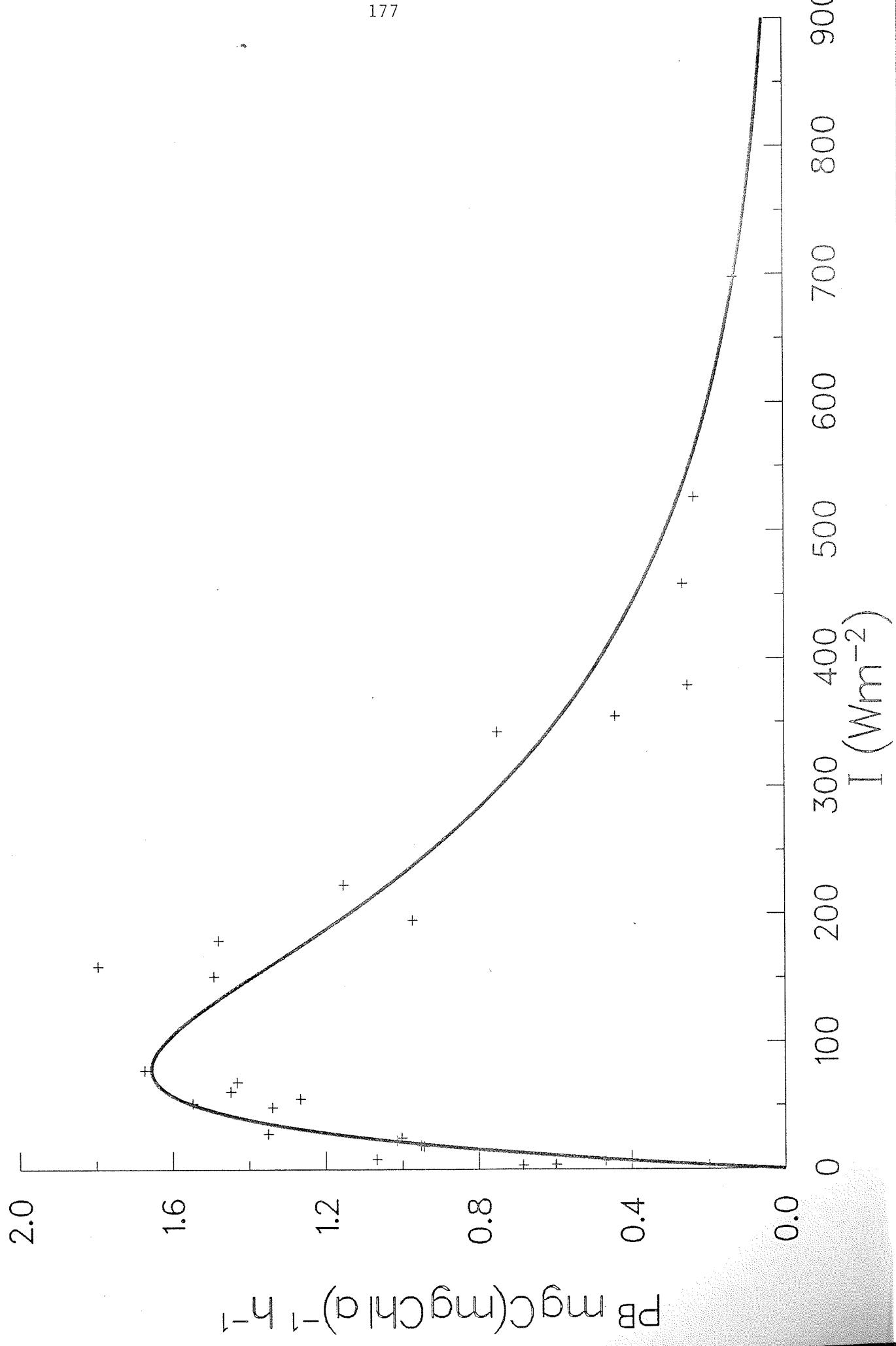
ID 016554>1 STA. 2 4/06/86 35 M

176



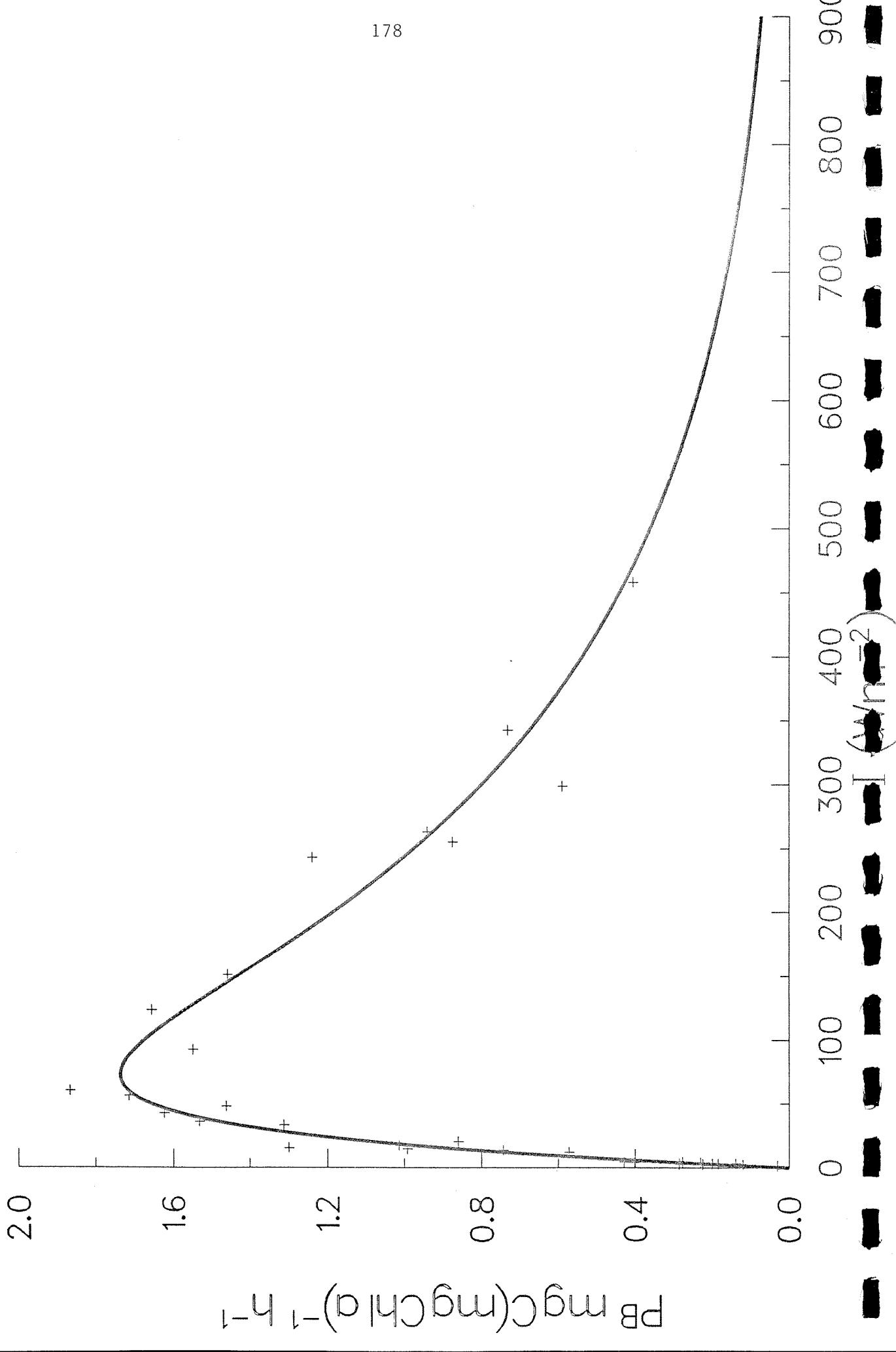
ID 016555<1 STA. 2 4/06/86 35 M

177



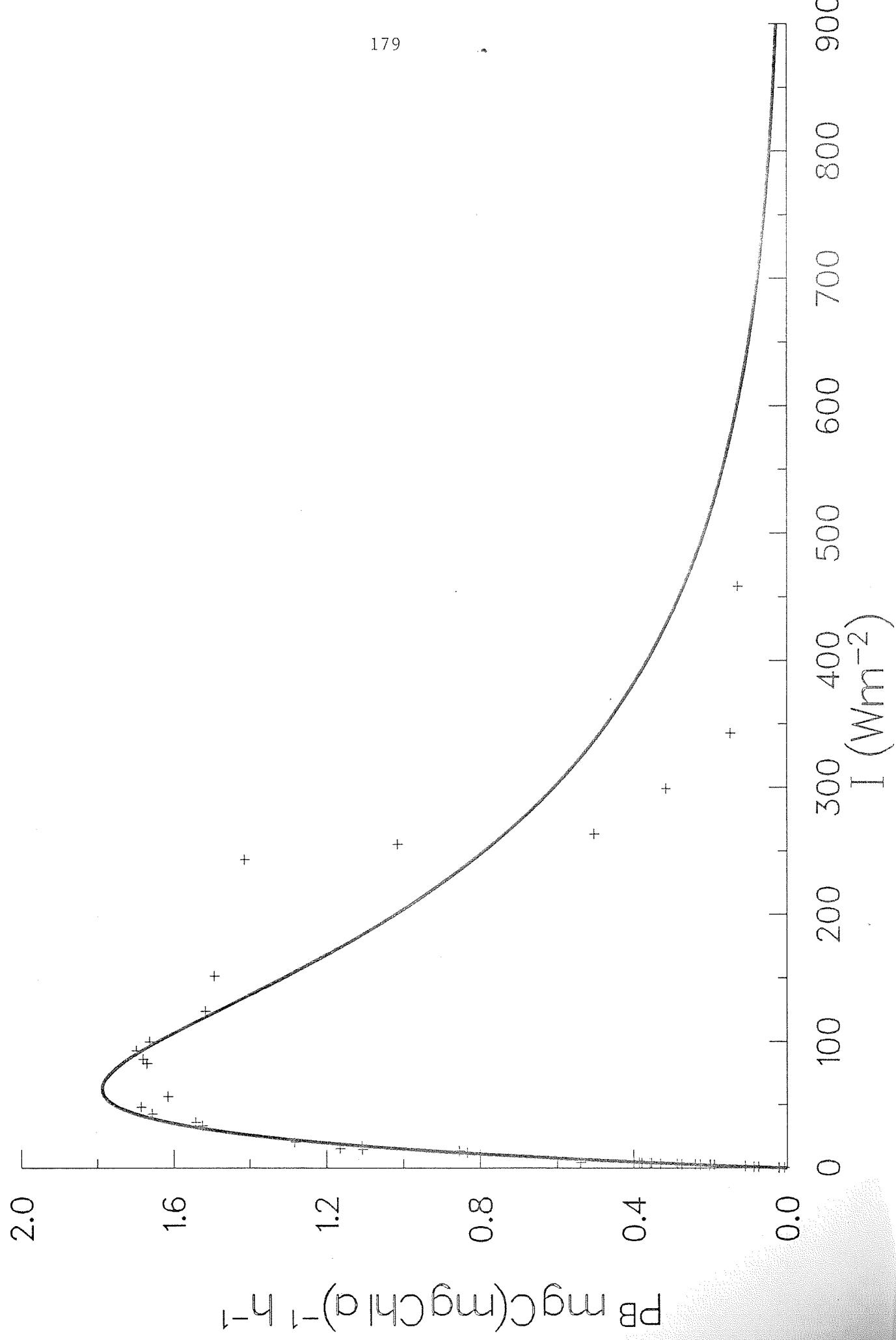
ID 016556>3 STA. 2 4/06/86 35 M

178

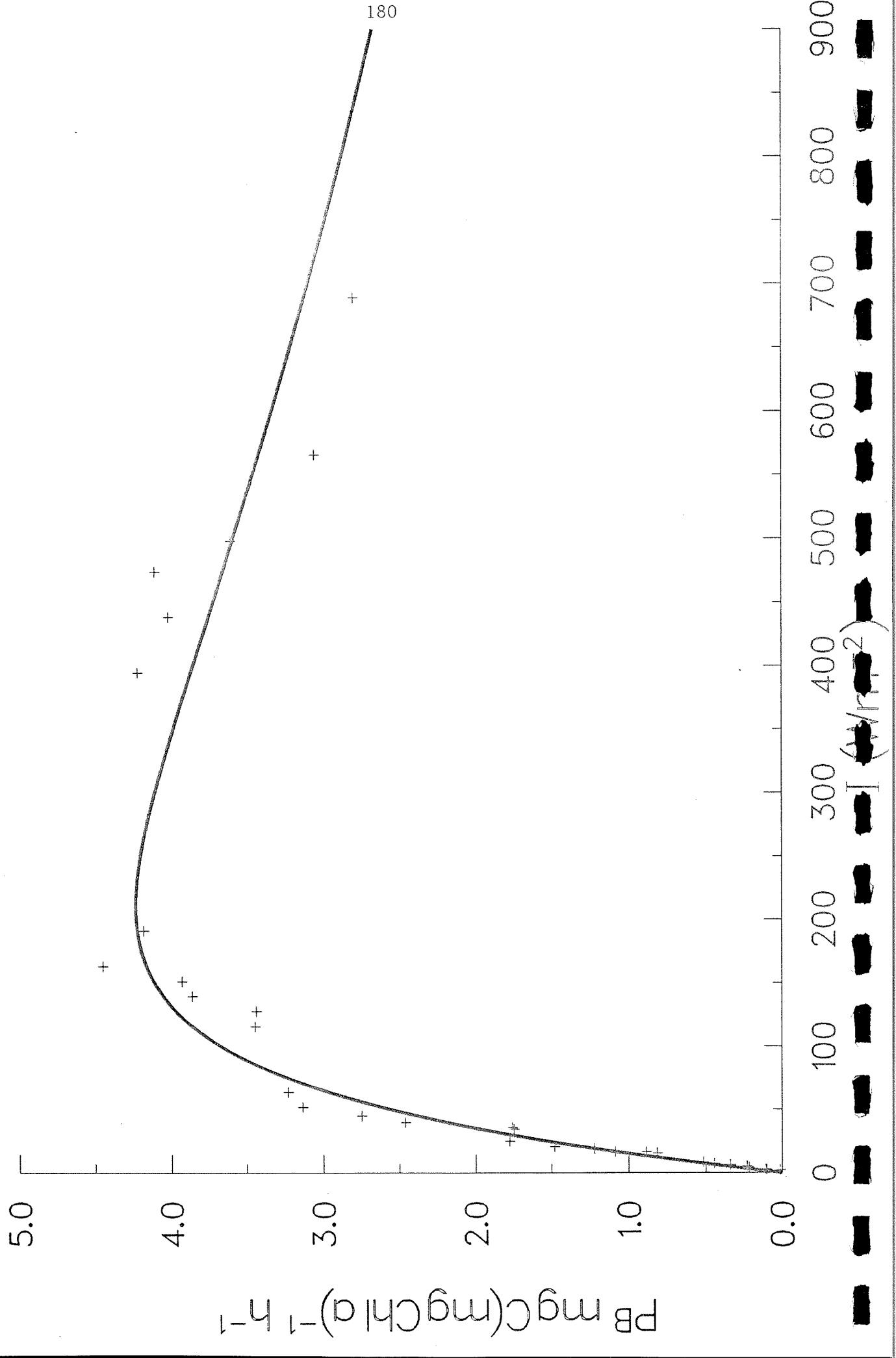


ID 016557<3 STA. 2 4/06/86 35 M

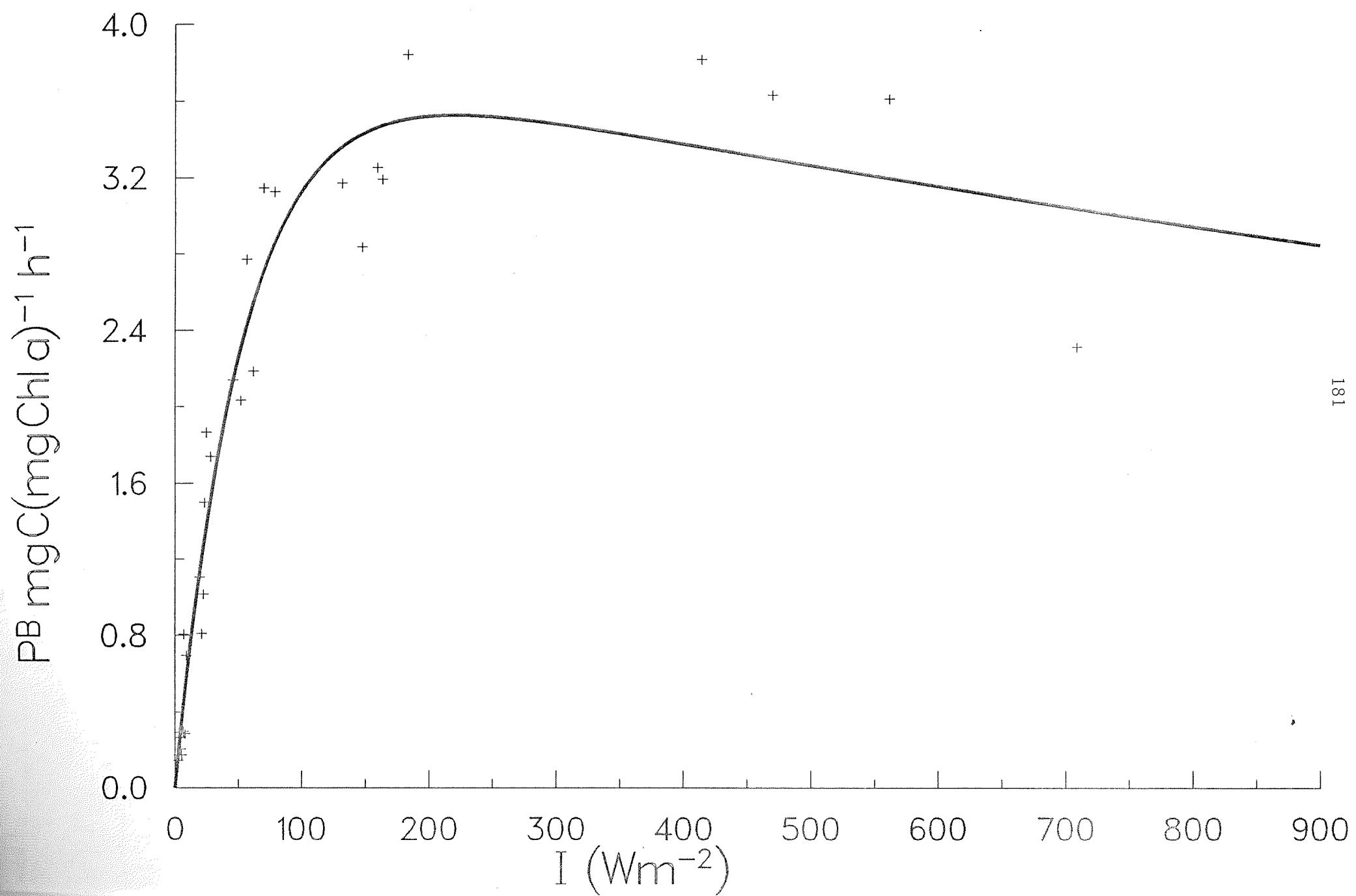
179



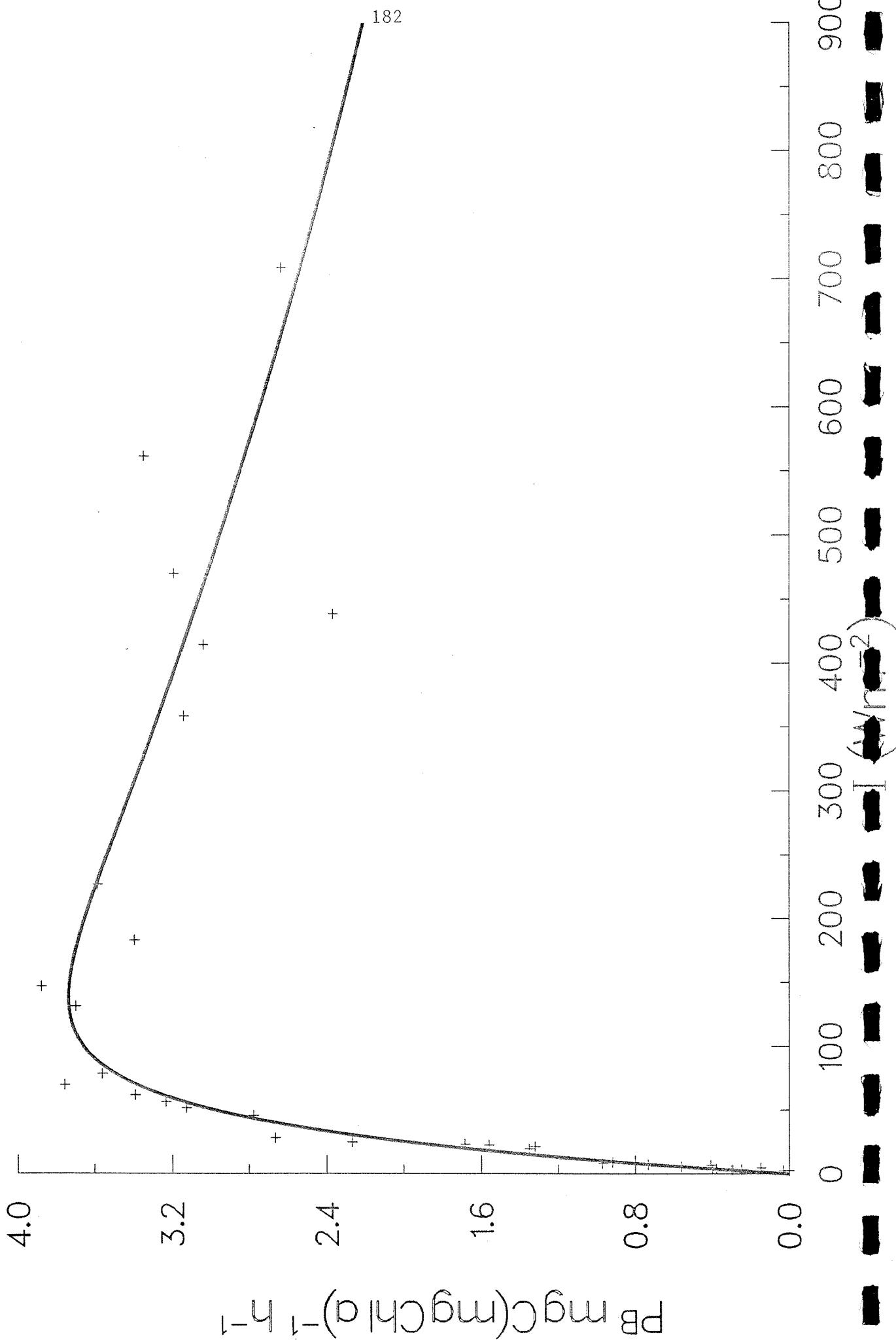
ID 016582W STA. 2 5/06/86 15 M



ID 016583>1 STA. 2 5/06/86 15 M

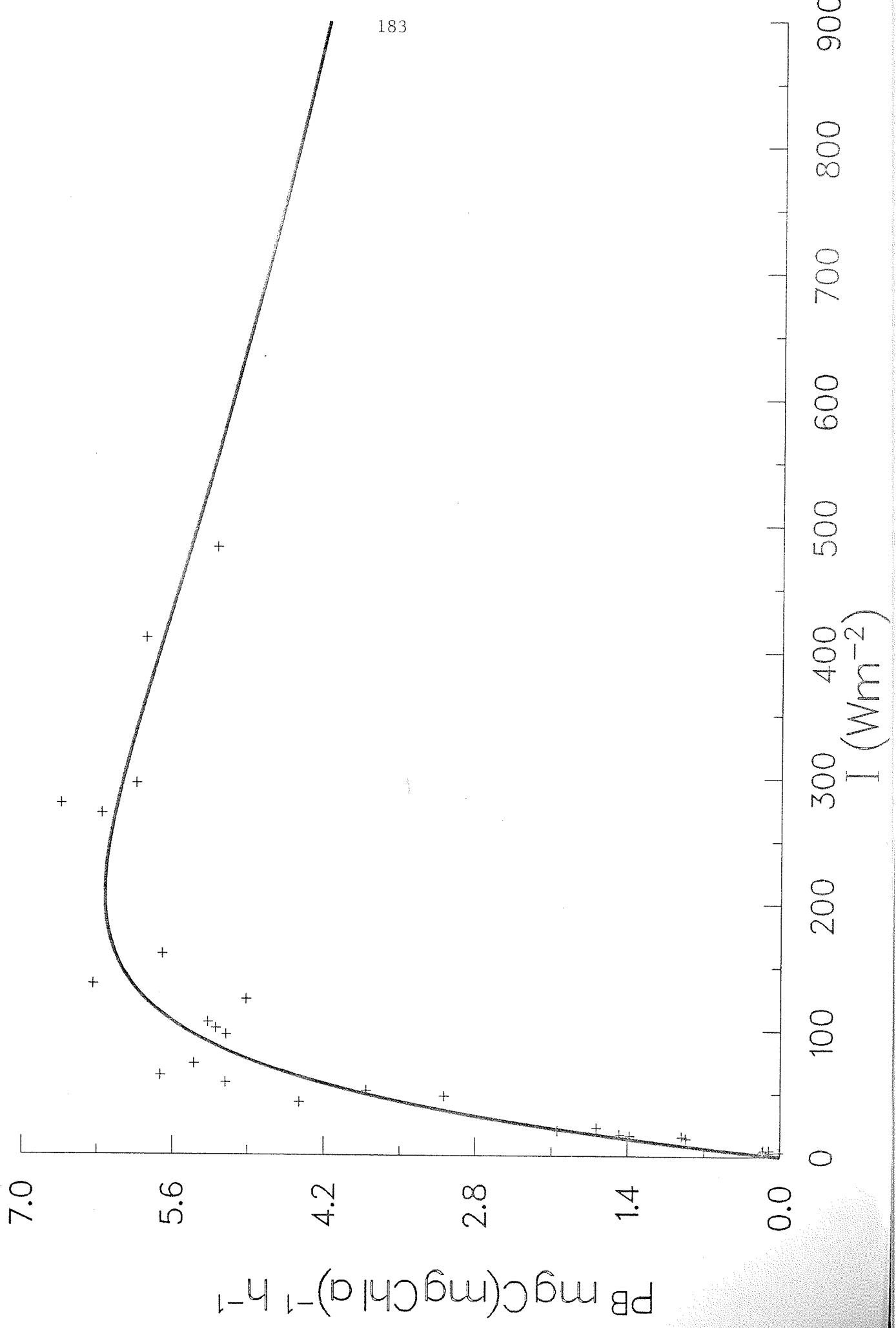


ID 016584<1 STA. 2 5/06/86 15 M

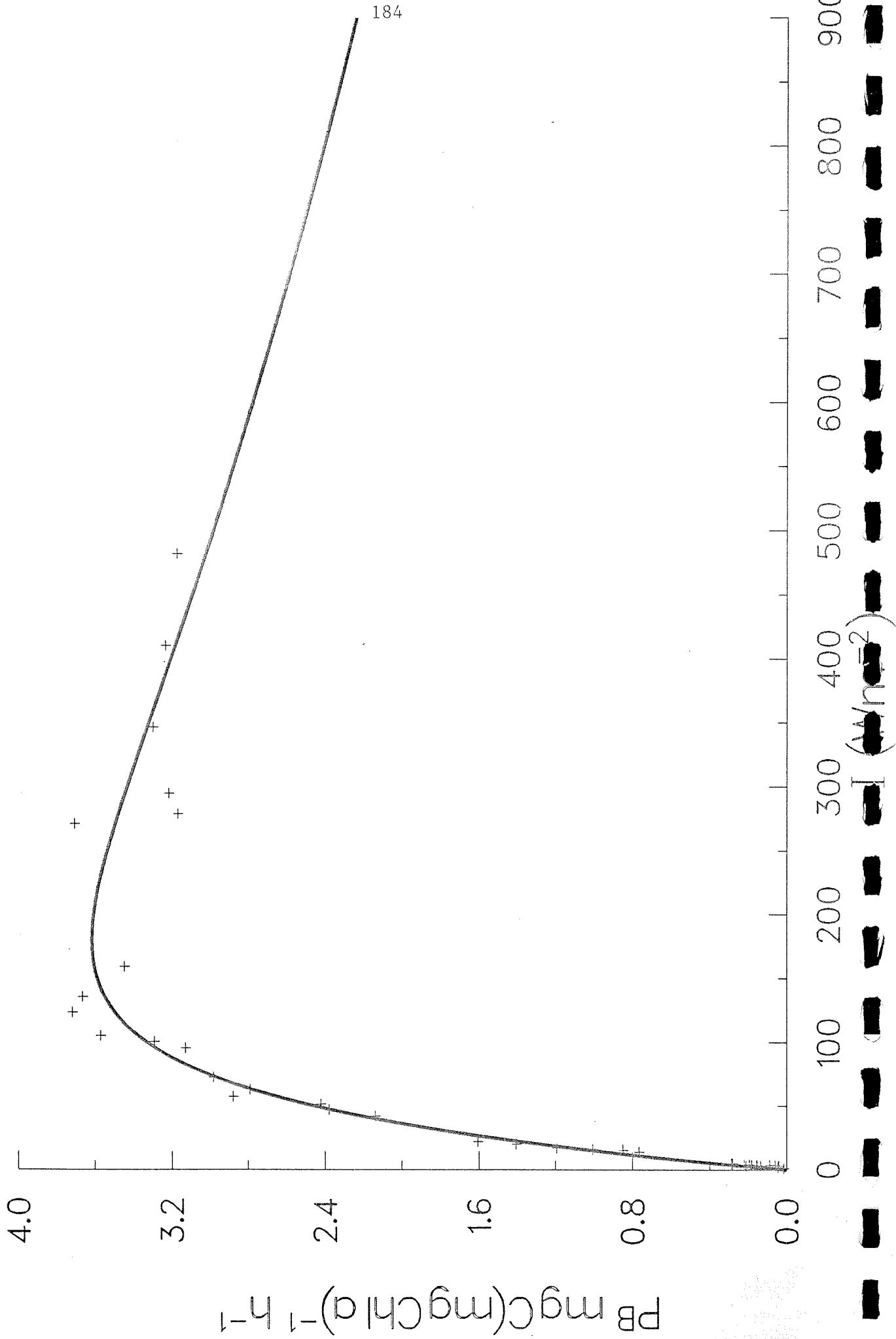


ID 016585>3 STA. 2 5/06/86 15 M

183

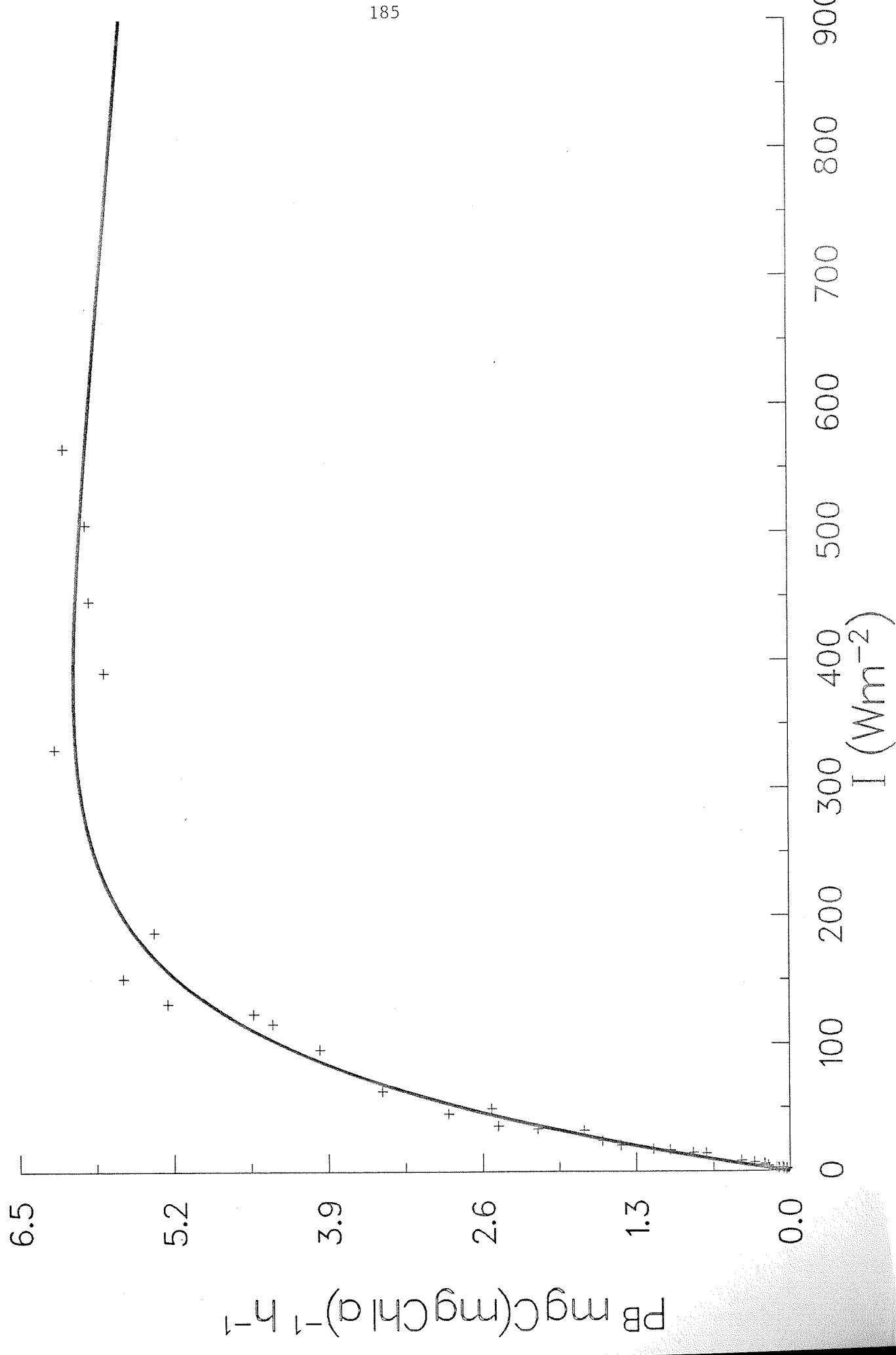


ID 016586<3 STA. 2 5/06/86 15 M



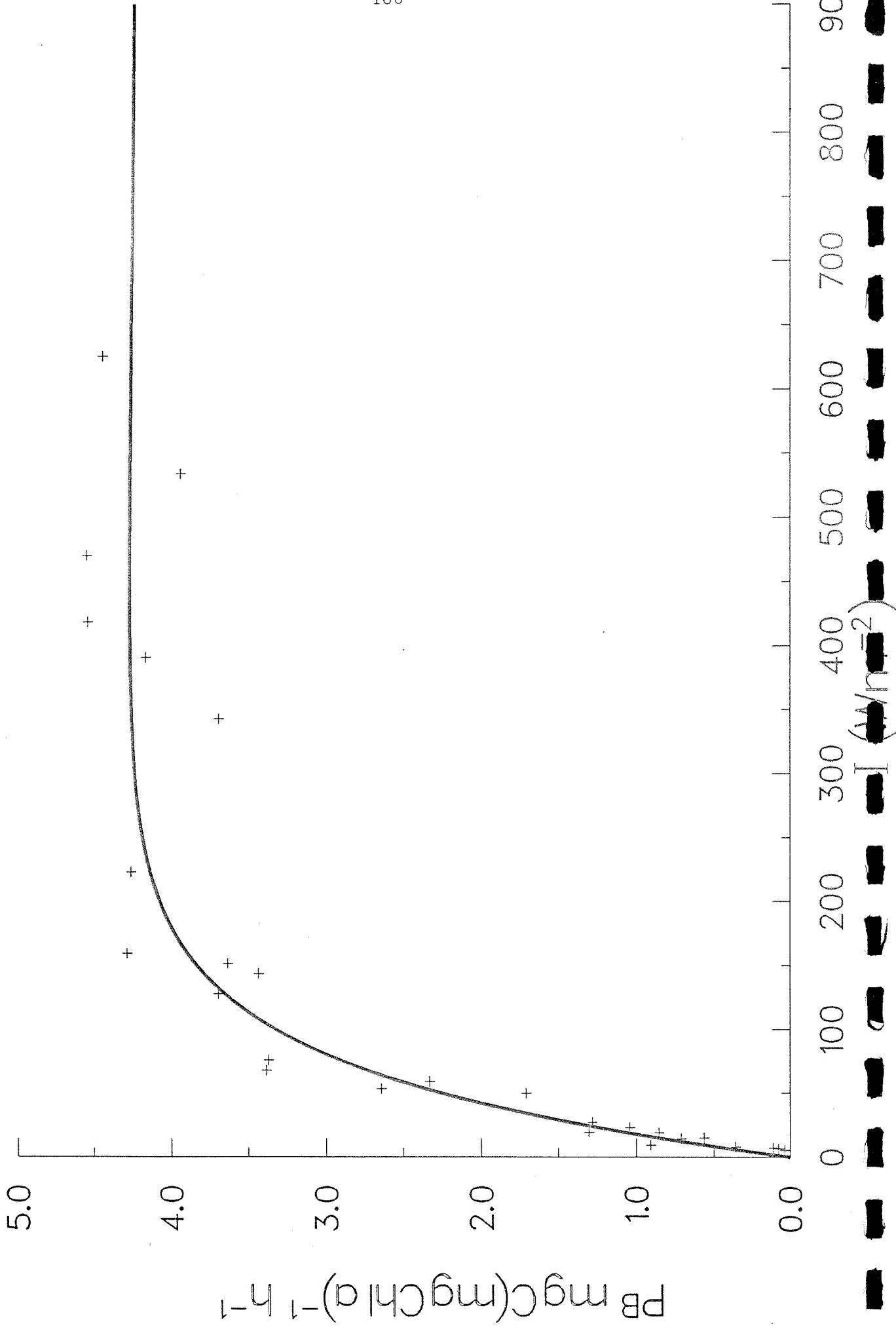
ID 017619W STA. 2 6/06/86 5 M

185



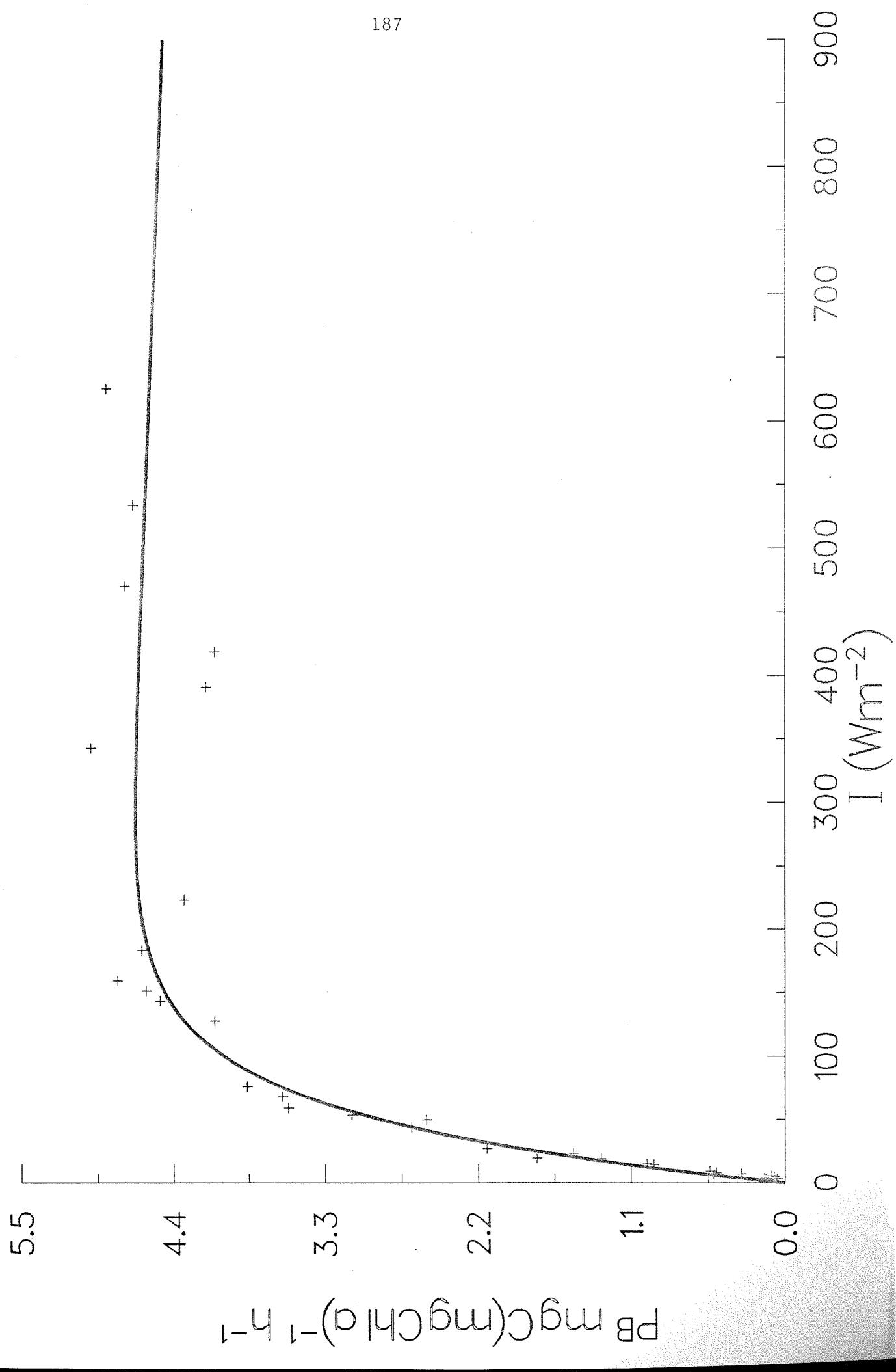
ID 017620>1 STA. 2 6/06/86 5 M

186



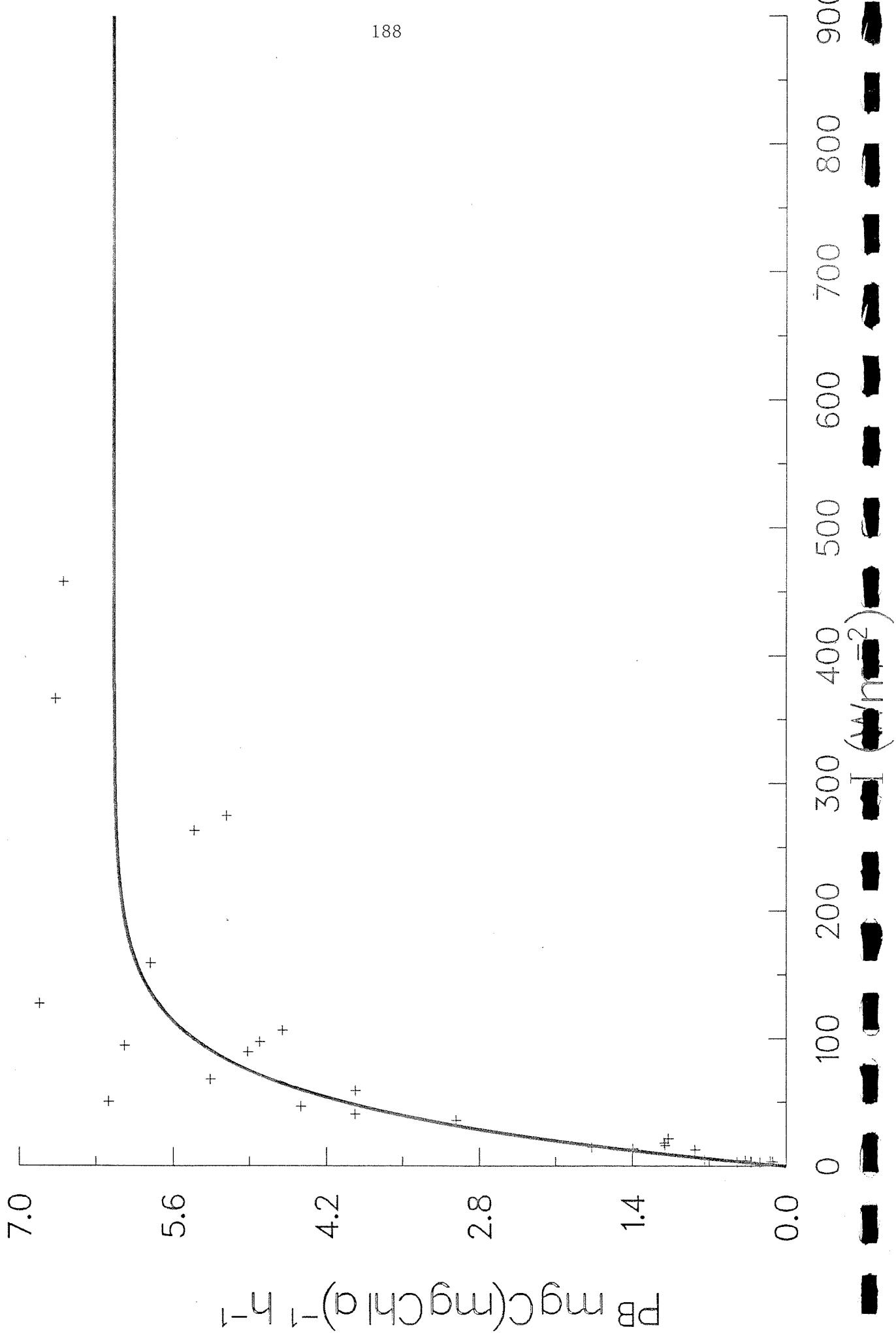
ID 017621<1 STA. 2 6/06/86 5 M

187



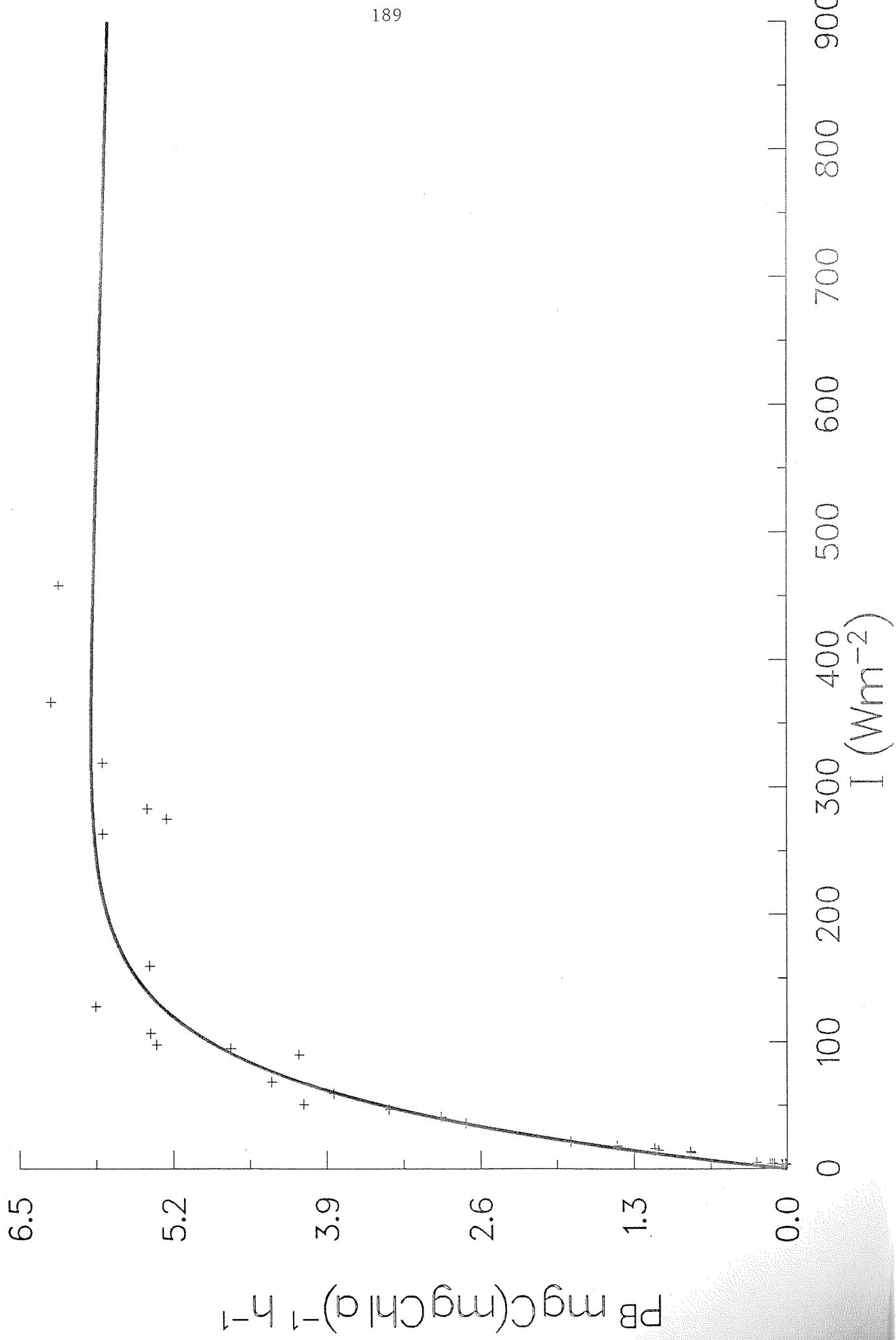
ID 017622>3 STA. 2 6/06/86 5 M

188



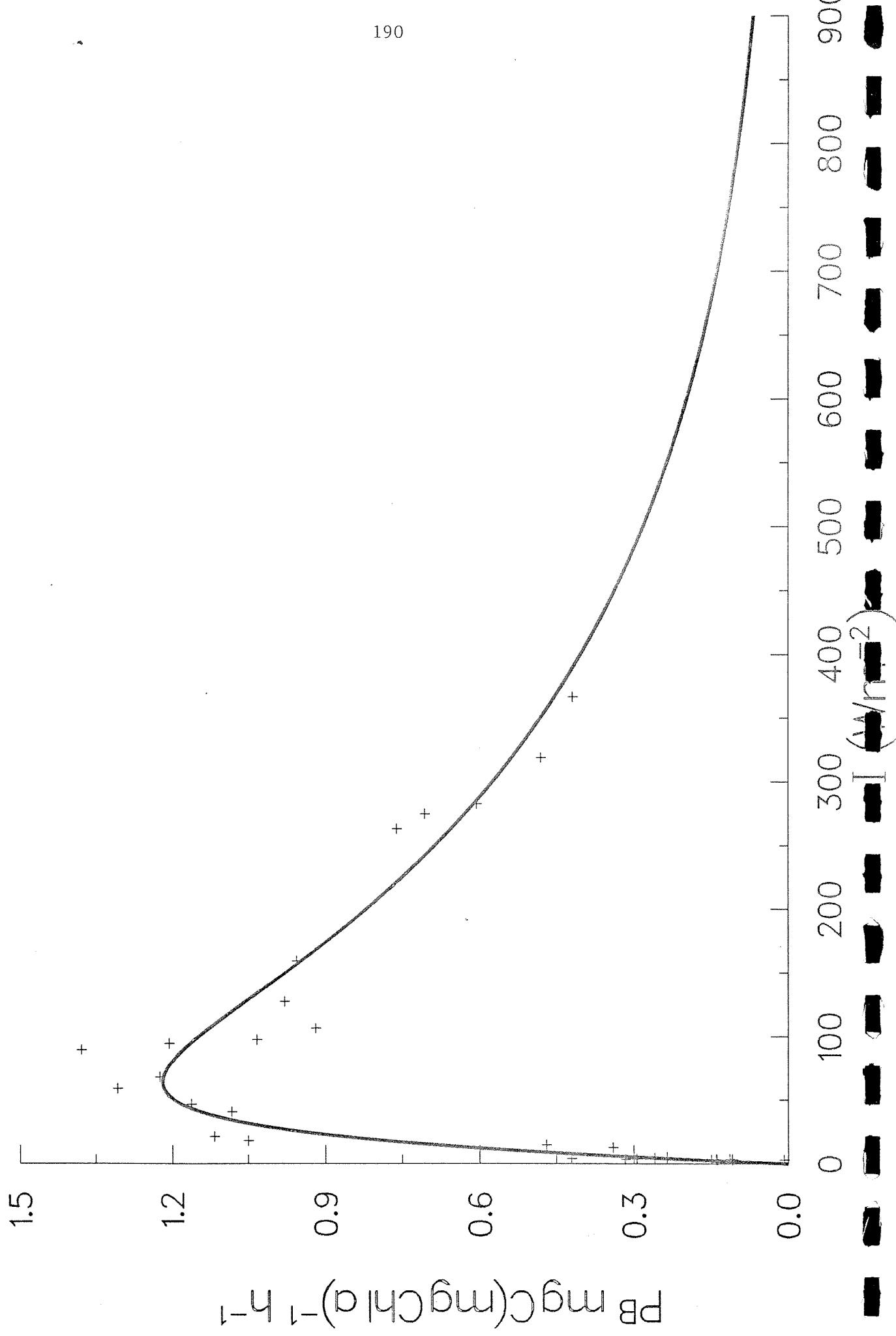
ID 017623<3 STA. 2 6/06/86 5 M

189



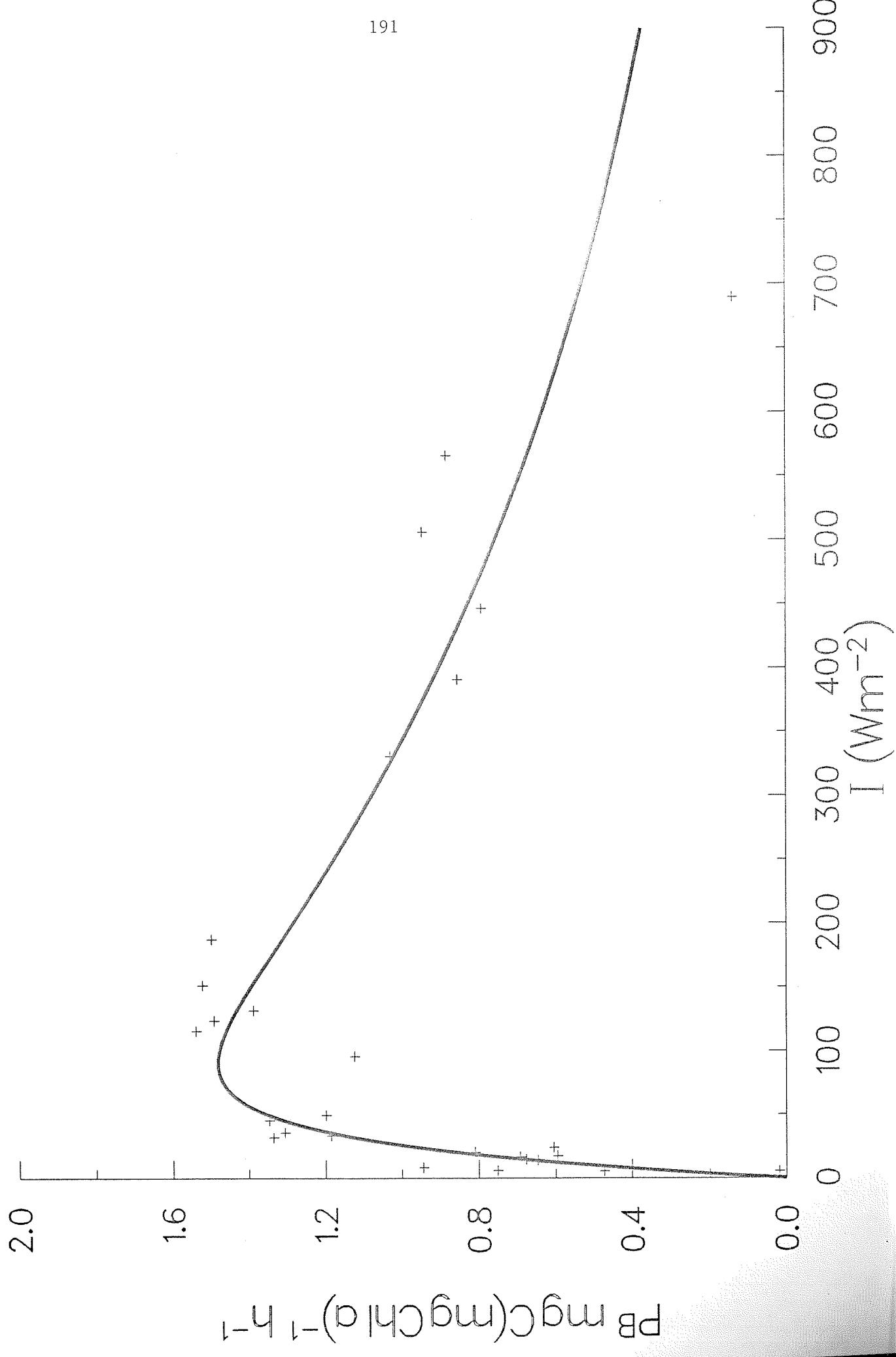
ID 017648 STA. 2 7/06/86 50 M

190



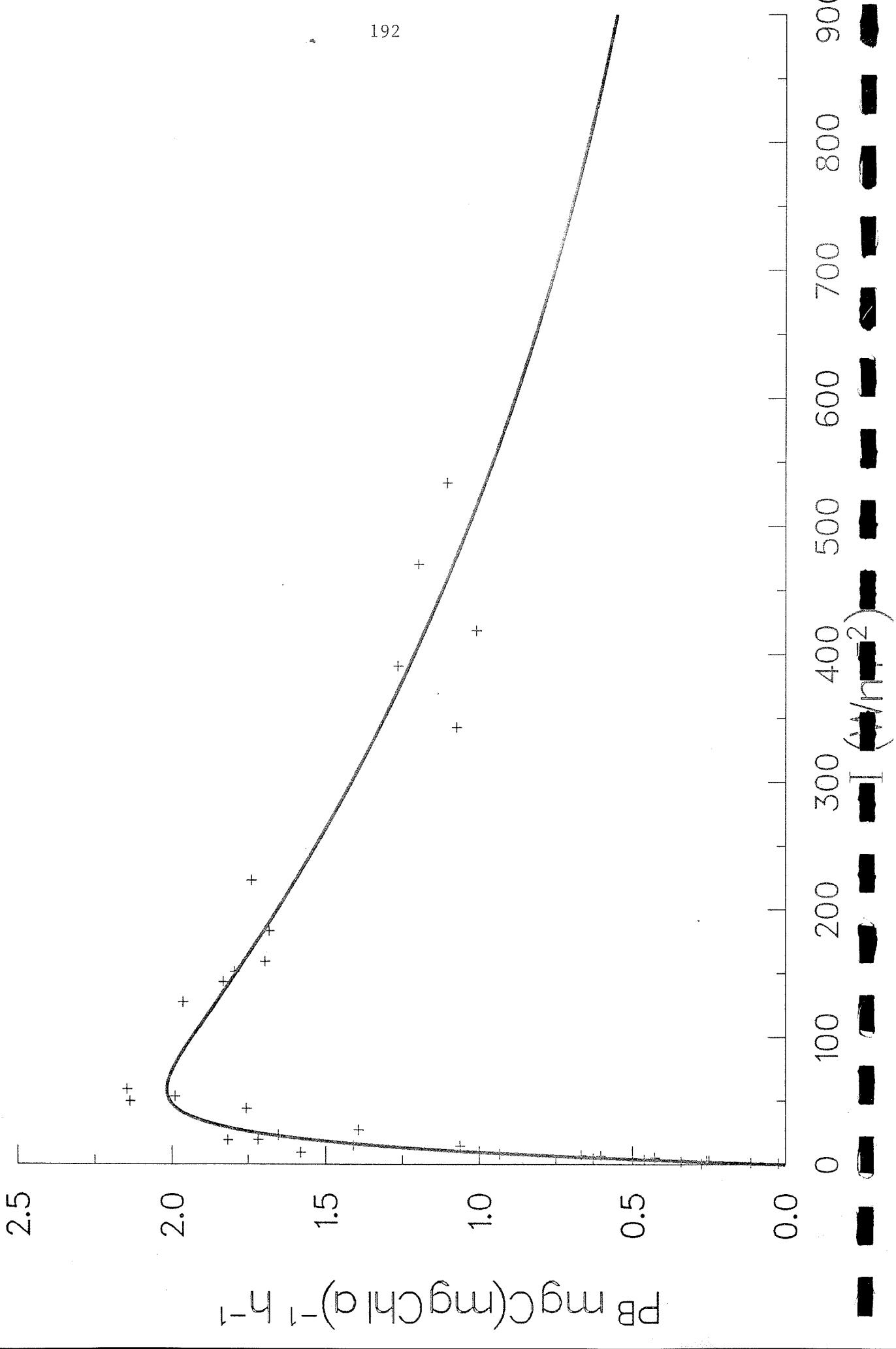
ID 017649 STA. 2 7/06/86 60 M

191

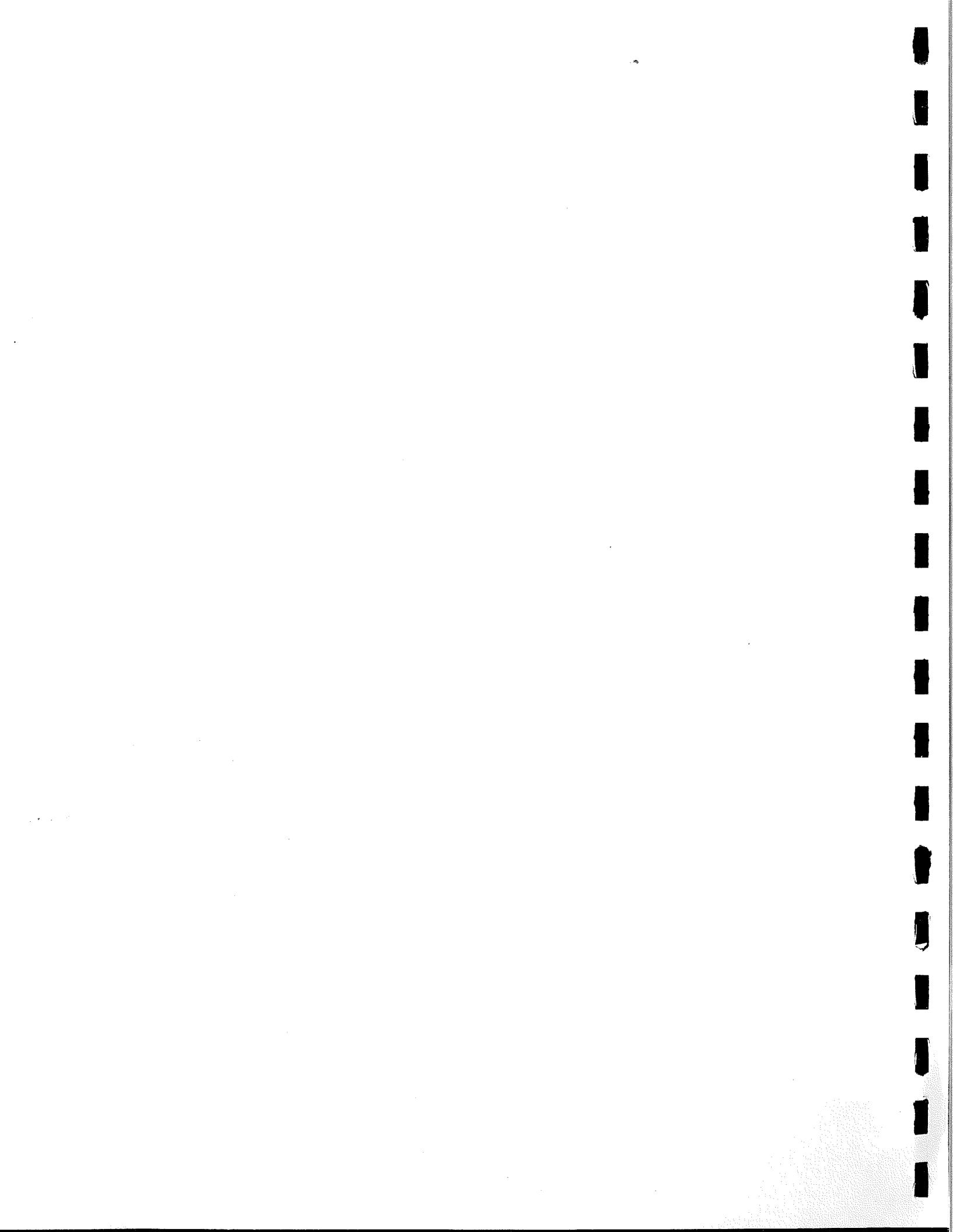


ID 017650 STA. 2 7/06/86 80 M

192



PROFILE DATA



UNITS

T = °C

NO₃ = mg at m⁻³

SiO₃ = mg at m⁻³

PO₄ = mg at m⁻³

Chl = mg m⁻³

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 18/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
3	9.83	1.68	1.57	.33	3.20	2.17	.83
10	9.83	2.37	2.28	.37	3.29	1.98	.73
21	9.82	2.89	2.24	.30	3.34	2.25	1.02
30	9.82	3.38	.99	.41	3.29	2.22	.71
44	9.81	3.73	1.15	.33	3.29	1.88	.70
46	9.76	3.08	.92	.45	2.78	2.20	.61
50	8.93	6.92	2.24	.41	.42	.28	.12
75	8.81	7.19	2.38	.57	.20	.13	.06

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 18/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
10	9.96	2.69	2.24	-	3.57	2.46	.86
20	9.87	1.52	1.55	-	3.94	2.69	.87
30	9.84	2.42	2.03	-	3.29	1.91	.86
40	9.82	2.40	2.06	-	2.92	1.83	.64
50	8.79	7.25	2.42	-	.25	.21	.08
60	8.78	6.46	3.26	-	.21	.19	.05
70	8.79	6.65	3.55	-	.19	.16	.04
80	8.79	6.72	2.74	-	.19	.19	.04

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 19/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
1	9.99	1.84	1.84	.33	3.99	2.83	1.10
10	9.99	2.19	2.00	.33	3.90	2.97	1.02
20	9.94	3.99	2.87	.45	3.66	2.83	1.04
30	9.84	2.06	1.90	.39	2.97	2.07	.69
40	9.82	2.33	2.03	.65	2.64	1.85	.47
45	9.39	3.54	2.13	.75	.96	.64	.24
50	8.75	7.39	3.10	.87	.21	.19	.05
75	8.75	7.48	-	.89	.19	.19	.04

198

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 19/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
6	10.41	1.54	2.52	-	3.11	2.07	.91
21	9.94	1.88	2.42	-	4.08	2.57	1.02
31	9.87	2.24	2.51	-	2.33	1.83	.44
41	9.82	2.73	3.16	-	1.23	.96	.30
51	8.72	6.67	3.22	-	.15	.14	.05
60	8.73	6.97	2.65	-	.17	.13	.04
70	8.73	6.67	3.22	-	.16	.14	.04

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 19/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
6	10.43	1.85	1.33	-	3.11	2.49	.81
22	9.95	2.12	1.71	-	5.47	3.43	1.61
32	9.85	-	-	-	2.15	1.64	.38
42	9.55	-	-	-	.73	.59	.18
52	8.73	-	-	-	.16	.15	.04
62	8.73	6.04	2.87	-	.16	.15	.07
73	8.73	6.82	2.45	-	.18	.14	.04
82	8.74	6.32	3.03	-	.17	.16	.03

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 20/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL>1	CHL<1
1	10.73	.13	.68	.23	2.97	2.15	.72
10	10.32	.40	.92	.31	3.20	2.25	.91
20	9.92	.57	1.00	.31	4.50	3.02	1.02
30	9.83	.60	1.19	.45	1.87	1.51	.19
40	9.79	1.37	1.59	1.34	1.28	.99	.24
44	9.56	3.34	2.20	.61	.79	.62	.15
48	8.80	6.44	2.51	.61	.40	.35	.06
75	8.76	6.45	2.46	.57	.18	.17	.04

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 20/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
2	10.57	.71	.97	-	2.60
11	10.50	.51	1.03	-	2.54
20	10.24	.38	.92	-	4.22
41	9.82	.67	-	-	1.56
62	8.72	6.68	1.96	-	.18
80	8.72	7.11	1.99	-	.19

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 23/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
1	10.20	.85	.90	-	2.65	1.98	.58
10	10.21	.66	.95	.23	2.73	1.98	.46
15	10.21	-	-	.23	2.69	2.13	.69
20	10.21	-	.56	.29	2.92	2.04	.52
25	10.19	.23	.69	.33	2.97	2.12	.49
40	9.98	.33	.40	.33	1.50	1.18	.28
50	8.78	3.43	1.14	-	.20	.15	.03
82	8.77	5.94	1.69	.73	.20	.19	.03

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 23/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
5	10.33	.11	.96	-	2.65
10	10.28	.20	.70	-	2.66
15	10.25	.18	.67	-	2.85
20	10.22	.44	1.26	-	2.95
25	10.13	.55	1.22	-	2.52
30	10.13	.55	1.06	-	1.98
35	10.11	.83	.76	-	1.85
40	10.09	1.95	.56	-	1.39

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 23/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
5	10.48	.42	1.03	-	2.58
10	10.47	.45	1.03	-	2.50
15	10.32	.55	1.00	-	2.55
20	10.21	.45	1.06	-	3.34
39	10.14	.64	1.61	-	1.72
43	9.24	2.00	1.98	-	.56
46	8.81	4.18	3.12	-	.20
82	8.78	6.91	2.78	-	.19

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 23/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
2	10.43	.22	-	-	2.46
10	10.42	.16	1.28	-	2.38
15	10.43	.18	1.14	-	2.50
20	10.26	.16	1.24	-	2.82
25	10.20	.19	1.27	-	3.28
30	10.18	.32	.79	-	2.63
35	10.15	.37	.13	-	1.83
40	9.75	1.43	1.48	-	.71
50	8.77	6.77	1.75	-	.18

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 24/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
1	10.36	.19	.99	.20	2.26	1.63	.63
10	10.36	.53	.91	.20	2.26	1.66	.57
20	10.35	.38	.82	.20	2.36	1.77	.59
29	10.20	.30	1.01	.23	3.02	2.12	.45
40	10.16	.33	1.13	.24	1.95	1.61	.29
44	9.97	1.12	1.68	.31	.89	.70	.10
46	8.84	6.03	1.97	.45	.32	.29	.05
81	8.78	7.18	1.98	.53	.24	.19	.03

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 25/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
1	10.40	.30	1.47	.20	2.07	1.56	.51
10	10.40	.51	1.03	.20	2.10	1.56	.55
20	10.39	.27	.73	.23	2.22	1.58	.55
31	10.35	.46	.91	.21	2.04	1.80	.31
37	10.20	.58	1.10	.33	1.44	1.12	.29
41	9.91	1.16	1.25	.45	1.05	.72	.21
45	8.92	5.35	2.13	.65	.17	.15	.03
82	8.91	6.73	1.93	.65	.16	.13	.03

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 25/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
1	10.47	.54	.42	-	2.09
5	10.46	.38	.37	-	2.14
10	10.44	.52	.45	-	2.09
15	10.45	.24	.39	-	2.01
20	10.42	.37	.94	-	2.23
40	10.29	.96	.82	-	1.32
50	8.93	-	-	-	-
80	8.91	6.29	1.16	-	.17

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 26/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
5	10.50	.36	.64	.20	1.58	1.32	.29
10	10.49	.43	.63	.20	1.72	1.16	.41
15	10.47	.48	.90	.20	1.69	1.28	.42
20	10.47	.50	.69	.20	1.71	1.20	.43
30	10.45	.31	.71	.20	1.82	1.31	.37
40	10.19	.32	-	.29	1.18	1.00	.19
60	8.83	6.43	1.99	.65	.21	.16	.03
80	8.83	6.58	1.76	.53	.21	.17	.04

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 29/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL>5	CHL<5
1	10.45	.41	-	.27	.97	.16	.73
10	10.45	.68	-	.29	.97	.16	.76
20	10.45	.60	-	.27	.99	.17	.77
30	10.45	.73	-	.37	1.00	.16	.67
40	10.45	.74	-	.00	.94	.17	.70
48	9.07	4.86	-	.73	.35	.09	.24
60	8.68	7.03	-	.53	.12	.06	.05
80	8.68	5.92	-	.53	.12	.07	.07

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 29/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
2	10.53	.37	-	-	.69
5	10.52	.36	-	-	.70
7	10.52	.35	-	-	.67
10	10.49	.30	-	-	.91
12	10.48	.33	-	-	.67
15	10.47	.53	-	-	.70
17	10.46	.33	-	-	.73
20	10.46	.35	-	-	.73

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 29/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
5	10.61	.12	-	-	.86
10	10.63	.11	-	-	.88
15	10.52	.12	-	-	1.13
20	10.50	.91	-	-	1.21
25	10.49	.33	-	-	1.23
30	10.48	.34	-	-	1.28
35	10.42	.34	.91	-	1.31
40	10.36	.44	1.28	-	1.26

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 30/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 5	CHL < 5
1	10.55	.74	-	-	.75	.15	.55
10	10.55	1.20	-	.27	.79	.12	.58
20	10.54	1.02	-	.25	.77	.15	.58
30	10.46	1.23	-	.33	1.18	.25	.86
43	10.33	.86	-	.41	1.08	.22	.83
50	8.69	7.15	-	.65	.14	.08	.08
60	8.69	6.87	-	.61	.13	.08	.06
80	8.69	7.19	-	.69	.14	.09	.07

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 30/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
1	10.80	.35	-	-	.66
10	10.65	1.27	-	-	.58
20	10.58	.38	-	-	.71
31	10.45	.33	-	-	1.23
40	10.37	.44	-	-	1.05
50	8.69	5.72	-	-	.15
60	8.69	6.11	-	-	.12
80	8.69	6.90	-	-	.13

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 30/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
1	10.84	.29	.64	-	.61
10	10.83	.43	.64	-	.58
15	10.64	.61	.69	-	.70
20	10.56	.87	.67	-	.81
30	10.51	1.12	.82	-	1.59
40	10.38	1.28	.83	-	.92
50	8.86	6.71	1.48	-	.17
80	8.86	6.59	1.11	-	.15

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 31/05/1986

Z	TEMP	NO3	S1O3	PO4	CHLW	CHL>5	CHL<5
1	10.62	.14	-	.20	.77	.17	.54
10	10.60	.35	-	.24	.77	.13	.30
20	10.47	.37	-	.25	1.29	.22	1.02
28	10.47	.28	-	.27	1.39	.24	1.02
33	10.46	.32	-	.35	1.21	.17	.97
41	10.09	.65	-	.41	.63	.14	.53
50	8.76	6.38	-	.61	.15	.10	.07
60	8.75	7.49	-	.53	.15	.09	.08

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 31/05/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
1	10.72	.52	-	-	.88
5	10.72	.40	-	-	.89
10	10.67	.33	-	-	.96
20	10.62	.32	-	-	1.00
30	10.47	.67	-	-	1.20
40	10.36	.54	-	-	.76
60	8.78	5.17	-	-	.13
80	8.77	5.64	-	-	.13

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 01/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
1	10.92	.55	-	.41	.62	.34	.21
10	10.91	.89	-	.27	.62	.33	.25
20	10.64	.54	-	.27	.73	.44	.24
30	10.51	.42	-	.29	1.20	.86	.22
40	10.34	.79	-	.37	.92	.64	.23
46	9.39	3.11	-	.53	.40	.30	.10
55	8.74	6.24	-	.85	.13	.11	.03
80	8.75	6.23	-	.53	.14	.11	.03

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 01/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
10	10.97	.21	-	-	.62
15	10.69	.29	-	-	.76
20	10.67	.67	-	-	1.02
25	10.61	.24	-	-	1.24
33	10.51	.30	-	-	1.71
44	9.79	2.83	-	-	.38
60	8.86	4.72	-	-	.16
82	8.88	4.81	-	-	.16

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 01/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
7	10.90	2.00	.35	-	.66
12	10.88	1.53	.42	-	.62
22	10.67	2.26	.58	-	1.23
26	10.62	2.66	.52	-	1.80
30	10.57	1.63	.66	-	1.88
52	8.90	5.85	1.32	-	.18
62	8.90	6.26	.70	-	.18
82	8.90	6.27	.83	-	.18

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 02/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
2	11.19	1.43	-	.20	.59	.36	.14
10	11.15	1.39	-	.20	.55	.33	.17
20	10.66	1.32	-	.20	.79	.51	.24
25	10.59	1.78	-	.27	1.13	.86	.24
31	10.51	.94	-	.29	1.61	1.10	.47
44	9.68	3.26	-	.61	.46	.36	.16
60	8.79	5.83	-	.65	.14	.13	.03
80	8.80	6.31	-	.65	.12	.11	.03

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 02/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
2	11.62	1.06	-	-	.38
10	11.21	1.38	-	-	.44
20	10.67	1.39	-	-	.66
30	10.52	1.25	-	-	1.29
35	10.50	1.18	-	-	1.20
40	10.40	1.09	-	-	.97
50	8.87	6.55	-	-	.13
60	8.86	6.45	-	-	.11

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 03/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 3	CHL < 3
2	11.24	.29	-	.22	.50	.14	.32
10	11.14	.78	-	.23	.58	.15	.39
20	10.95	.43	-	.29	.60	.15	.42
30	10.51	.73	-	.31	1.56	.40	1.23
40	10.44	.57	-	.31	1.28	.40	.73
50	8.80	5.70	-	.61	.11	.09	.06
60	8.80	5.81	-	.61	.10	.08	.04
80	8.81	6.96	-	.57	.09	.09	.03

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 03/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
2	11.14	.16	-	-	.36
10	11.20	.15	-	-	.45
20	10.79	.16	-	-	.65
30	10.54	.16	-	-	1.18
40	10.47	.23	-	-	1.16
46	10.12	-	1.00	-	.66
50	8.83	6.77	-	-	.12
60	8.83	6.93	-	-	.12

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 04/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 3	CHL < 3
2	11.29	1.00	-	.35	.38	.12	.25
17	11.29	2.10	-	.31	.38	.12	.27
19	11.00	1.42	-	.21	.55	.15	.37
35	10.53	.80	-	.25	1.91	.52	1.28
40	10.51	.98	-	.21	1.20	.49	.73
46	9.83	3.00	-	.41	.64	.44	.33
50	8.83	7.39	-	1.54	.11	.08	.04
80	8.83	7.26	-	.61	.12	.07	.04

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 04/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
3	11.44	1.31	-	-	.38
11	11.37	1.42	-	-	.39
16	11.00	1.28	-	-	.57
21	10.68	1.27	-	-	1.36
28	10.57	1.50	-	-	2.02
41	9.94	3.56	-	-	.60
50	8.87	6.38	-	-	.11
80	8.86	7.46	-	-	.11

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 04/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
2	11.56	.93	.73	-	.53
10	11.39	1.04	.76	-	.57
20	11.11	.31	.80	-	.88
25	10.82	.51	.86	-	1.20
33	10.63	.81	.80	-	2.34
40	10.56	1.12	.66	-	1.31
45	9.77	3.50	.88	-	.53
50	8.98	5.70	.73	-	.10

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 05/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL>3	CHL<3
2	11.42	1.11	-	.24	.39	.14	.25
10	11.39	.82	-	.23	.42	.15	.31
20	10.71	1.70	-	.27	1.04	.22	.80
25	10.62	1.52	-	.27	1.29	.29	.86
30	10.54	1.62	-	.21	1.85	.55	1.39
41	10.42	1.57	-	.43	.94	.40	.57
46	8.79	7.07	-	.85	.15	.11	.05
80	8.78	6.71	-	.65	.09	.08	.04

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 05/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
10	11.45	.29	-	-	.34
20	10.71	.29	-	-	.81
25	10.61	.14	-	-	1.29
35	10.51	.29	-	-	1.10

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 05/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
10	11.30	.11	-	-	.48
20	10.76	.12	-	-	1.00
25	10.59	.11	-	-	1.31
35	10.50	.64	-	-	1.20

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 05/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
10	11.46	.18	-	-	.34
20	11.05	1.04	-	-	.64
25	10.69	.32	-	-	1.02
35	10.53	.23	-	-	1.90

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 05/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
10	11.63	.60	-	-	.35
20	11.03	.22	-	-	1.02
25	10.80	.23	-	-	1.51
35	10.54	.48	-	-	2.14

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 05/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
10	11.49	.13	-	-	.51
20	10.78	.37	-	-	.92
25	10.63	.62	-	-	1.23
35	10.51	.57	-	-	1.80

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 05/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
10	11.69	.20	-	-	.37
20	11.23	.18	-	-	.60
25	10.66	.15	-	-	1.15
35	10.51	.40	-	-	1.71

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 06/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL > 1	CHL < 1
2	11.68	.33	-	.20	.36	.22	.12
10	11.66	.20	-	.20	.37	.21	.14
20	10.88	.08	-	.23	.99	.58	.39
27	10.75	.70	-	.29	1.24	.73	.39
34	10.59	.24	-	.23	2.25	1.28	.97
43	9.82	1.48	-	.31	.58	.55	.14
50	8.83	7.56	-	.61	.10	.09	.02
80	8.82	7.13	-	.49	.10	.09	.02

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 06/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
10	11.71	.21	-	-	.34
20	10.92	.16	-	-	.39
25	10.66	.88	-	-	.54
30	10.52	.14	-	-	.65
40	10.36	1.08	-	-	.67
45	10.05	1.86	-	-	.58
50	8.81	6.69	-	-	.17
80	8.80	6.37	-	-	.15

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 06/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
2	11.79	.81	.54	-	.53
10	11.65	.28	.66	-	.47
20	11.32	.44	.67	-	.58
30	10.71	.19	.45	-	1.15
35	10.62	.28	.41	-	2.17
40	10.57	.21	.45	-	1.83
47	10.22	1.20	.52	-	.58
80	8.92	6.61	1.32	-	.10

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 07/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW	CHL>3	CHL<3
10	11.87	.26	-	.20	.37	.10	.26
20	11.41	.43	-	.22	.44	.13	.31
27	10.77	.70	-	.22	.60	.13	.50
35	10.61	.51	-	.20	1.13	.43	.65
41	10.51	.26	-	.25	1.18	.43	.81
44	9.89	1.89	-	.33	.82	.35	.45
50	8.94	6.54	-	.49	.13	.10	.05
80	8.94	6.88	-	.49	.11	.07	.05

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 07/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
2	11.94	.10	-	-	.47
10	11.92	.12	-	-	.47
20	11.30	.33	-	-	.65
30	10.72	.79	-	-	1.31
40	10.63	.25	-	-	1.90
50	9.14	6.36	-	-	.20
60	9.07	6.27	-	-	.11
80	9.07	4.93	-	-	.11

CHARLES DARWIN 1986

LAT 50°30' N

LONG 7° 0' W

DATE 07/06/1986

Z	TEMP	NO3	SIO3	PO4	CHLW
2	12.14	.18	.30	-	.56
10	12.11	.34	.52	-	.56
20	11.29	.57	.61	-	.68
25	10.97	.20	.35	-	.53
30	10.71	.28	.58	-	1.15
39	10.39	.39	.70	-	.77
50	9.16	6.63	.77	-	.09
80	9.05	7.00	.95	-	.09