

PROJECT TCP/SOM/8906 & 0104

FAO TECHNICAL CO-OPERATION PROGRAMME / SOMALI GOVERNMENT

( OPERATIONAL DRAWINGS )

HYDROLOGICAL DATA COLLECTION AND UPGRADING OF THE NATIONAL HYDROMETRIC NETWORK ON THE JUBBA AND SHEBELLI RIVERS, ALSO THE IN-SERVICE TRAINING OF THE FIELD OPERATIONAL STAFF.

VOLUME ' 4 '

By

BRIAN A.P. GEMELL

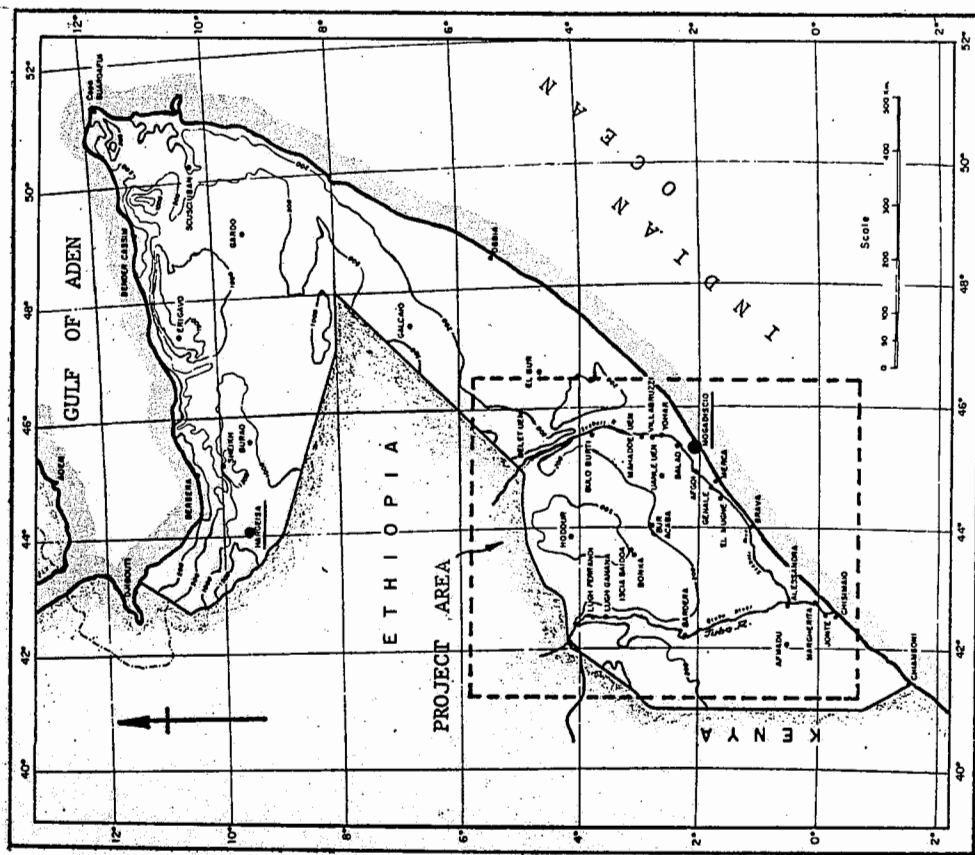
( FAO Consultant Hydrologist )

May 1982

Harrow, Middlesex, England.

# TOPOGRAPHICAL MAP

SHOWING PROJECT AREA



A B B R E V I A T I O N S

mm	-	millimeters
cm	-	centimeters
m	-	meters
m <sup>2</sup>	-	meters squared
m <sup>3</sup>	-	meters cubed
mcm	-	million cubic meters
m <sup>3</sup> x 10 <sup>6</sup>	-	million cubic meters
m <sup>3</sup> x 10 <sup>3</sup>	-	thousands of cubic meters
Km	-	kilometer
Km <sup>3</sup>	-	kilometers square
m/sec	-	meters per second
m <sup>3</sup> /sec	-	meters cubed per second
W.L.	-	water level
R/B	-	right bank
L/B	-	left bank
S/A	-	slope area measurement
WP	-	wetted perimeter
R	-	hydraulic radius
S	-	slope
A	-	area
n	-	roughness factor
BM	-	benchmark
TBM	-	temporary benchmark
CTF	-	cease to flow
R.L.	-	relative level
A.D.	-	assumed datum
WERD	-	waters edge right bank
WELB	-	waters edge left bank
MSL	-	mean sea level
G.Z.	-	gauge zero
'MB'	-	measuring point( bridge )
'MP'	-	measuring point( recorder wall )
G.H.	-	gauge height
'MMP'	-	Sir M. Macdonald & Partners Ltd.
'HTS'	-	Huntings Technical Services Ltd.

I N D E X

SHEBELLI RIVER ( Rating Curves, Tables & Cross Sections )

Section '1'	-	Belet Uen
Section '2'	-	Rulo Burti
Section '3'	-	Mahaddei Uen
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Section '5'	-	Audegle

JUBBA RIVER ( Rating Curves, Tables & Cross Sections )

Section '6'	-	Lugh Ganana
Section '7'	-	Bardheere
Section '8'	-	Jamamme

RIVER STAGE HYDROGRAPHS ( 1980/81 )

Section '9'	-	Shebelli River
Section '10'	-	Jubba River

RIVER STAGE & DISCHARGE DATA SHEETS

Section '11'	-	Shebelli River ( 1980/81 )
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WATER LEVEL DATA QUALITY 'BAR CHARTS'

Section '13'	-	Shebelli & Jubba Rivers ( 1980/81 )
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SECTION ' 1 '

SHEBELLI RIVER AT BELET UEN

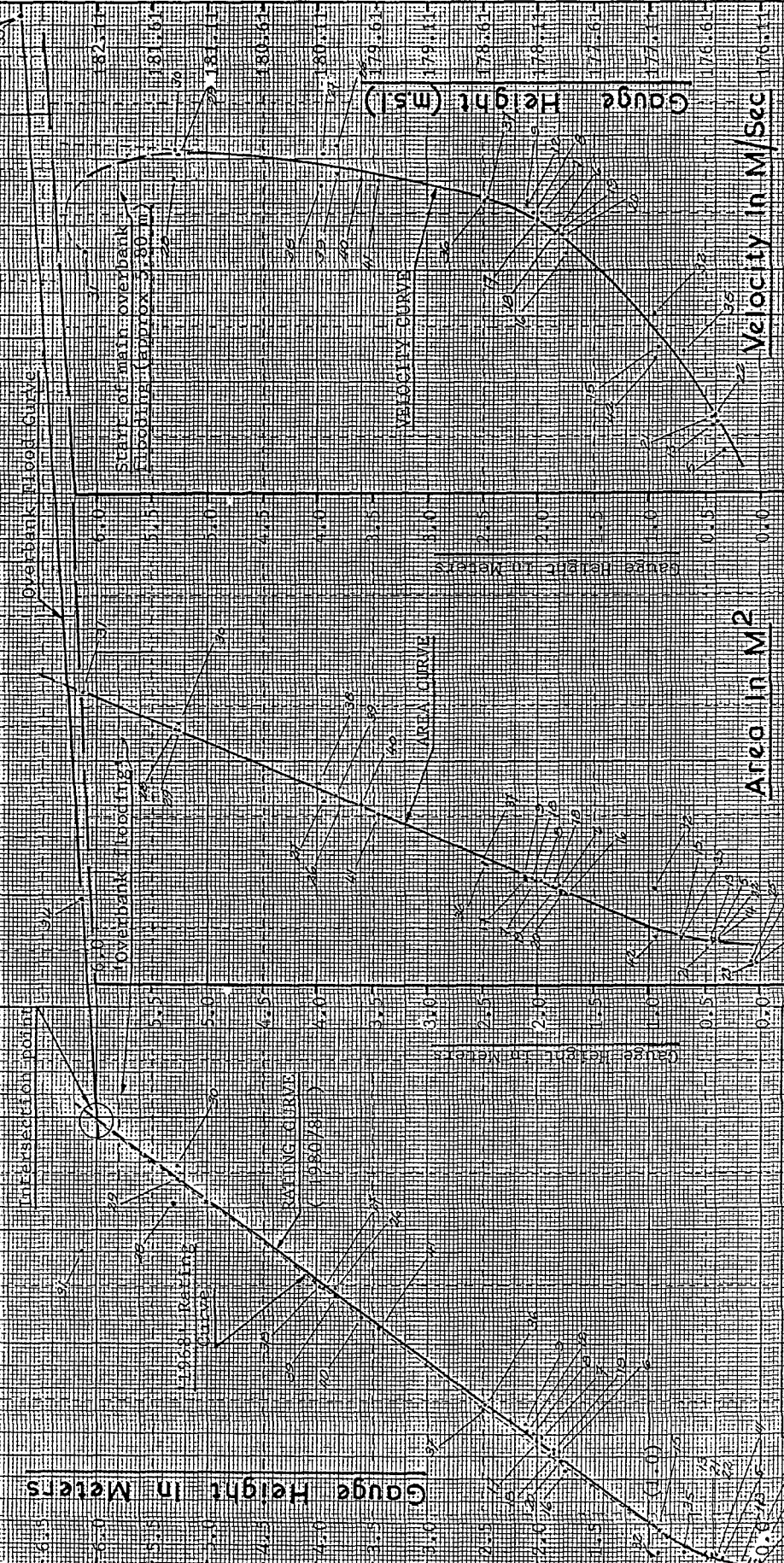
1. RATING TABLE
2. RATING CURVE ( Natural Scale )
3. RATING CURVE ( Log/Log Scale )
4. CROSS SECTIONS

# SHEBELLI RIVER AT BELET UEN

## RATING CURVE

Historical Peak Flood (7/5/81)  
 GN 6.70 m Q 1595 m<sup>3</sup>/sec

(1987/88)



1000  
 900  
 800  
 700  
 600  
 500  
 400  
 300  
 200  
 100  
 0

Discharge in M<sup>3</sup>/Sec

Area in M<sup>2</sup>

Velocity in M/Sec

Gauge Height in Meters

Gauge Height (m)

1500  
 1400  
 1300  
 1200  
 1100  
 1000  
 900  
 800  
 700  
 600  
 500  
 400  
 300  
 200  
 100  
 0

# SHEBELLI RIVER AT BELET UEN RATING CURVE

(1980/81)

NOTE: This curve has been plotted to the Gauge Height plus 20 cm. The plotting of the Rating Table will be at this (GH -20).

2) Measurements 1-22 observed in 1980.

3) Measurements 23-42 observed in 1981.

OVERBANK FLOOD CURVE

Intersection Point (A)  
GH = 6.08 m, Q = 393.7 m<sup>3</sup>/sec

Q = 9.09990559 h<sup>1.101</sup>

MEDIUM CURVE

Q = 6.2 h<sup>1.187</sup>

LOW CURVE

Q = 0.98 h<sup>1.73</sup>

Intersection Point (B)  
GH = 2.24 m, Q = 130.5 m<sup>3</sup>/sec

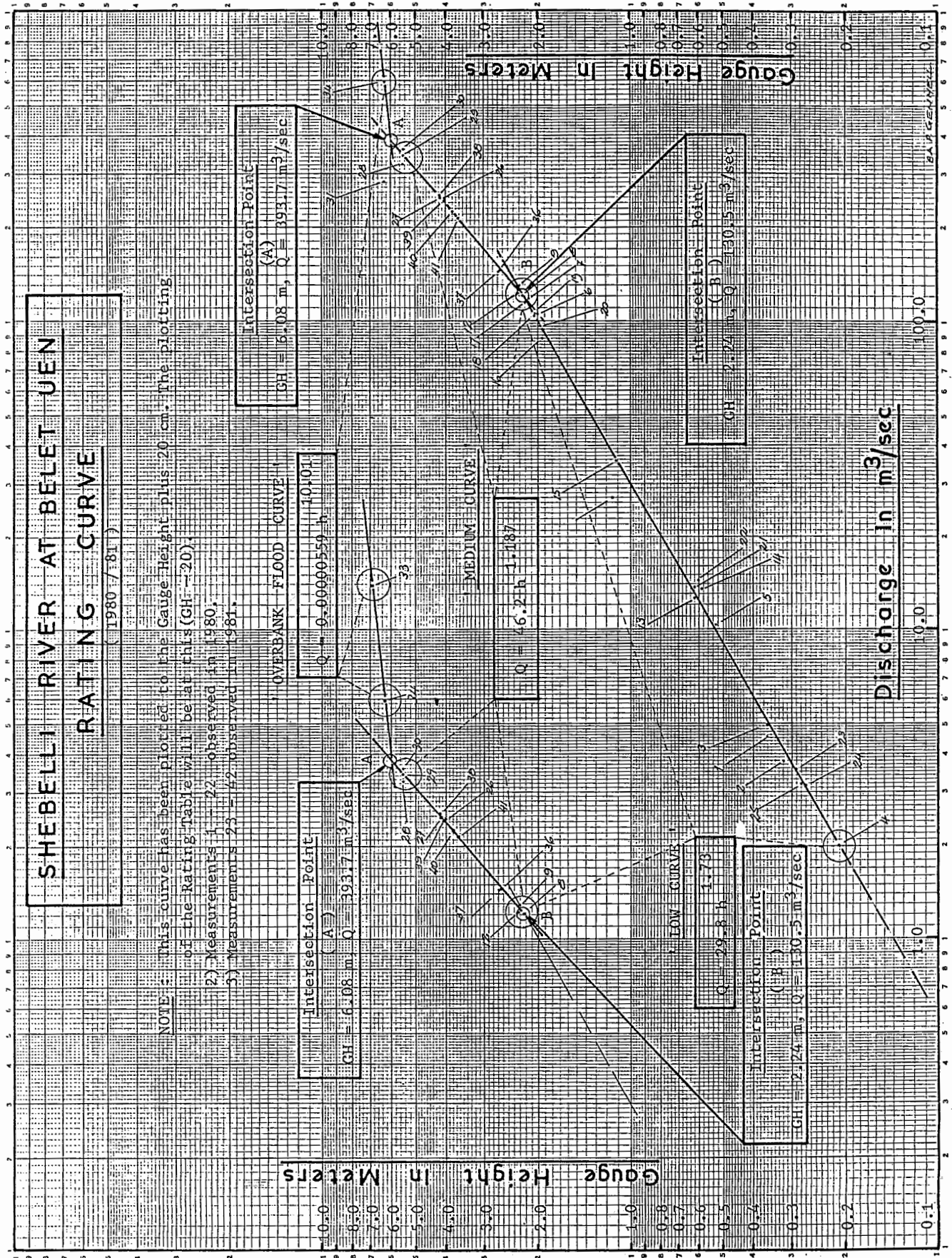
Intersection Point (A)  
GH = 6.08 m, Q = 393.7 m<sup>3</sup>/sec

Intersection Point (B)  
GH = 2.24 m, Q = 130.5 m<sup>3</sup>/sec

Gauge Height in Meters

Gauge Height in Meters

Discharge in m<sup>3</sup>/sec



# SHEBELLI RIVER AT BELET UEN

## CROSS SECTIONS

(1980)



### Width in Meters

NOTE:

The cross section for the measurement taken in the flood recession has changed quite considerably. This is quite possible as the left bank had been pushed up with rubbish and could have collapsed as the velocities increased as the water level returned to the channel.

SECTION ' 2 '

SHEBELLI RIVER AT BULO BURTI

1. RATING TABLE
2. RATING CURVE ( Natural Scale )
3. RATING CURVE ( Log/Log Scale )
4. CROSS SECTIONS

# SHEBELLI RIVER AT BULO BURTU

## RATING CURVE

(1980) (1981)

NOTE: This curve has been established from discharge measurements taken after the gauges were reset in March 1980.

Gauge Height in Meters

### 1968 RATING CURVE

### RATING CURVE (1980/81)

### AREA CURVE

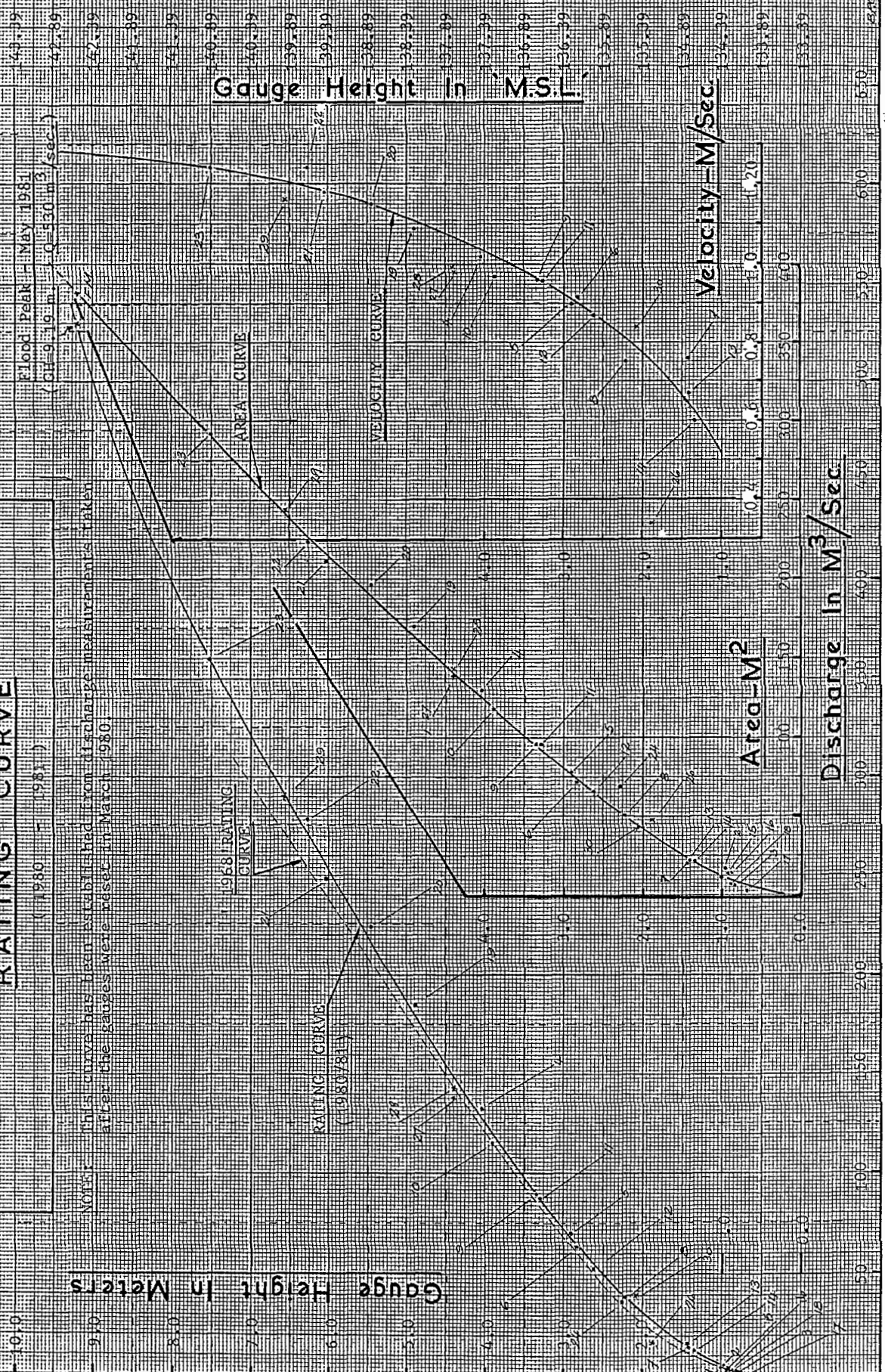
### VELOCITY CURVE

Gauge Height in M.S.L.

Velocity - M/Sec

Area - M<sup>2</sup>

Discharge in M<sup>3</sup>/Sec





# SHEBELLI RIVER AT BULO BURTU

## RATING CURVE

(1980 - 1981)

Slope Area measurement  
Flood of May 1981

TOP CURVE  
 $Q = 5.25 \text{ m}^3/\text{sec}$   
 $h = 2.08$

Intersection point  
 $Gt = 8.0 \text{ m}$ ,  $Q = 397.12 \text{ m}^3/\text{sec}$

MEDIUM CURVE  
 $Q = 7.07 \text{ m}^3/\text{sec}$   
 $h = 2.10$

LOW CURVE  
 $Q = 5.2 \text{ m}^3/\text{sec}$   
 $h = 1.94$

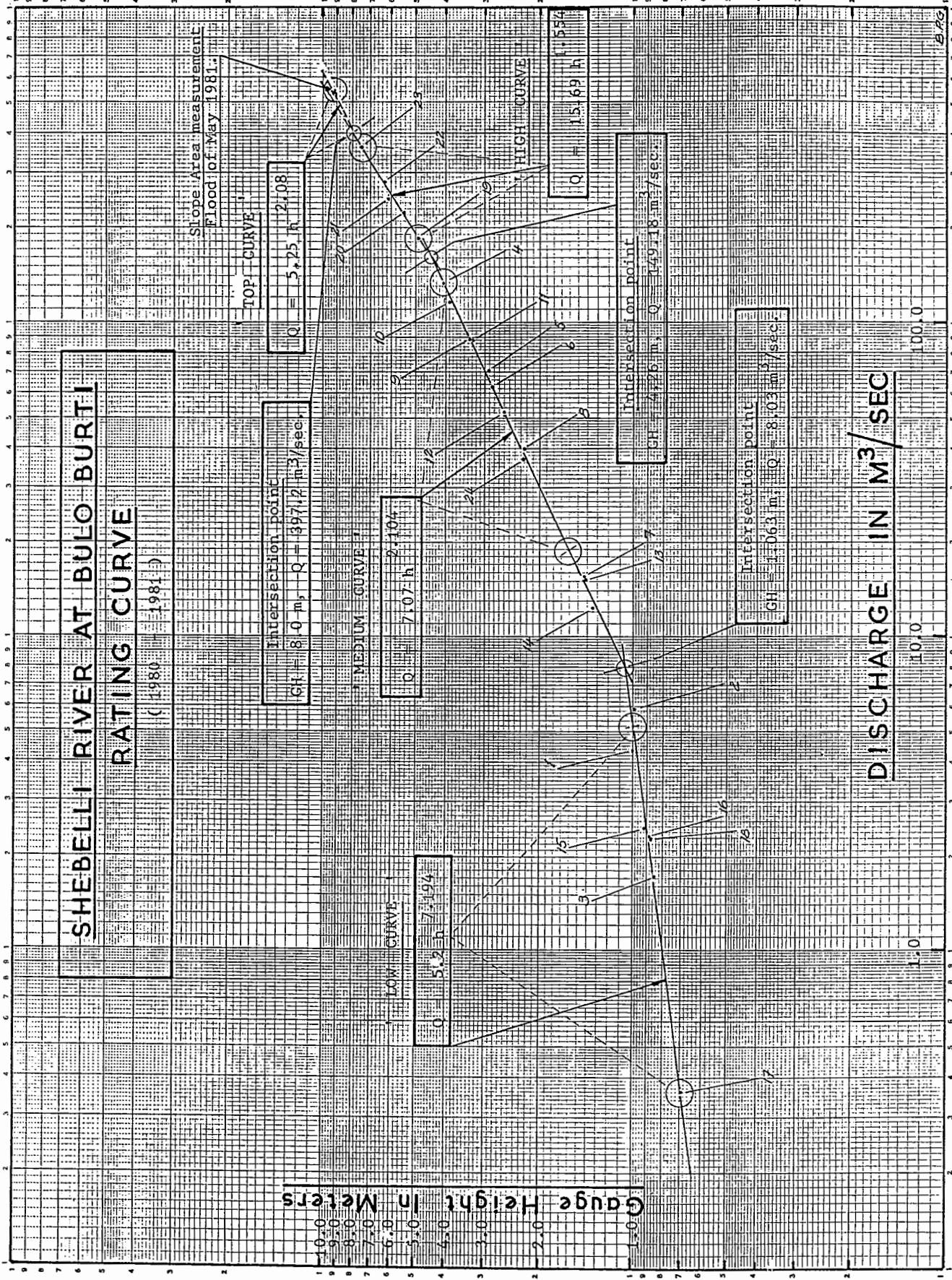
HIGH CURVE  
 $Q = 15.69 \text{ m}^3/\text{sec}$   
 $h = 1.55$

Intersection point  
 $Gt = 4.96 \text{ m}$ ,  $Q = 149.18 \text{ m}^3/\text{sec}$

Intersection point  
 $Gt = 1.063 \text{ m}$ ,  $Q = 8.03 \text{ m}^3/\text{sec}$

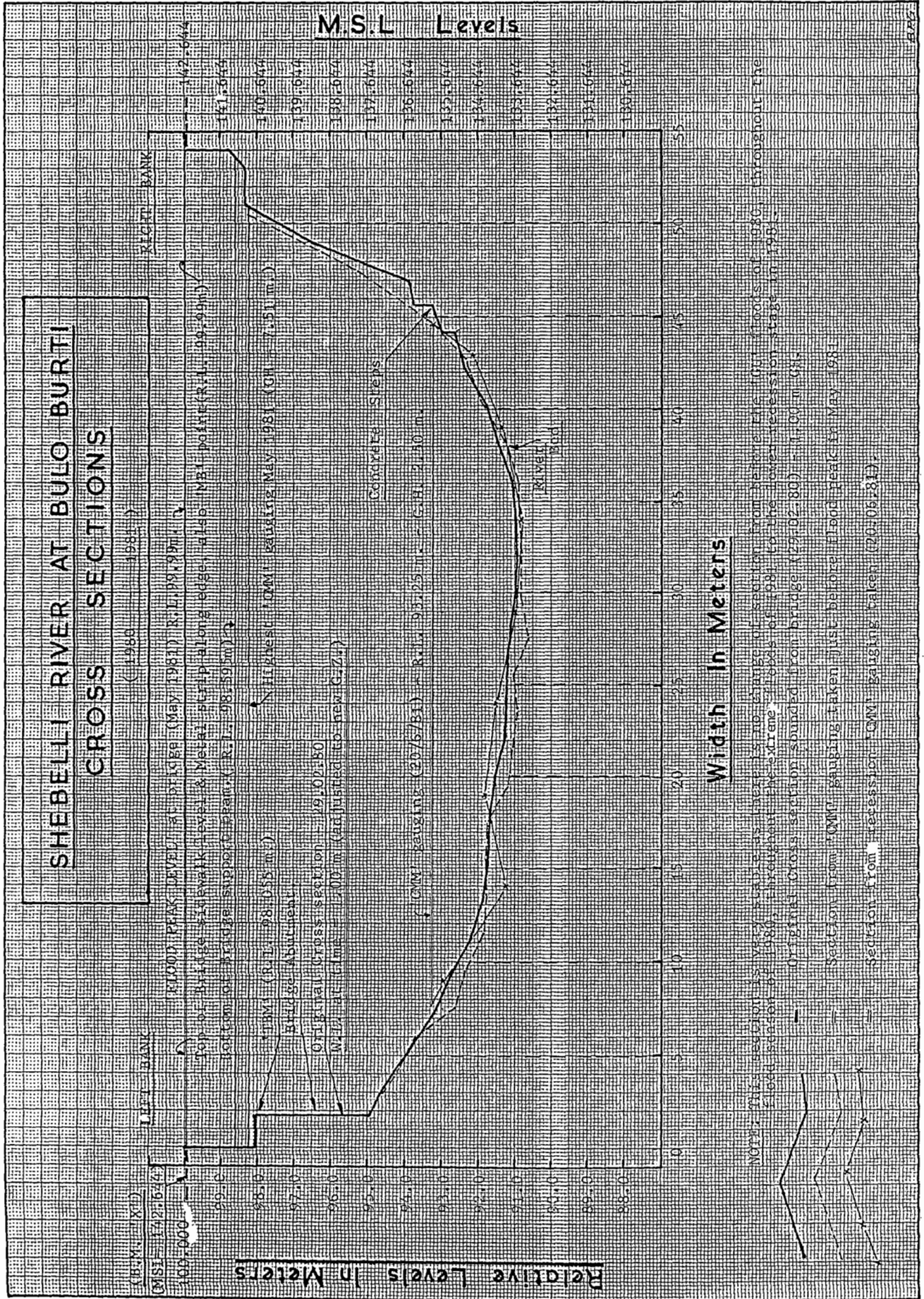
Gauge Height in Meters

DISCHARGE IN M<sup>3</sup>/SEC



# SHEBELLI RIVER AT BULO BURTU

## CROSS SECTIONS







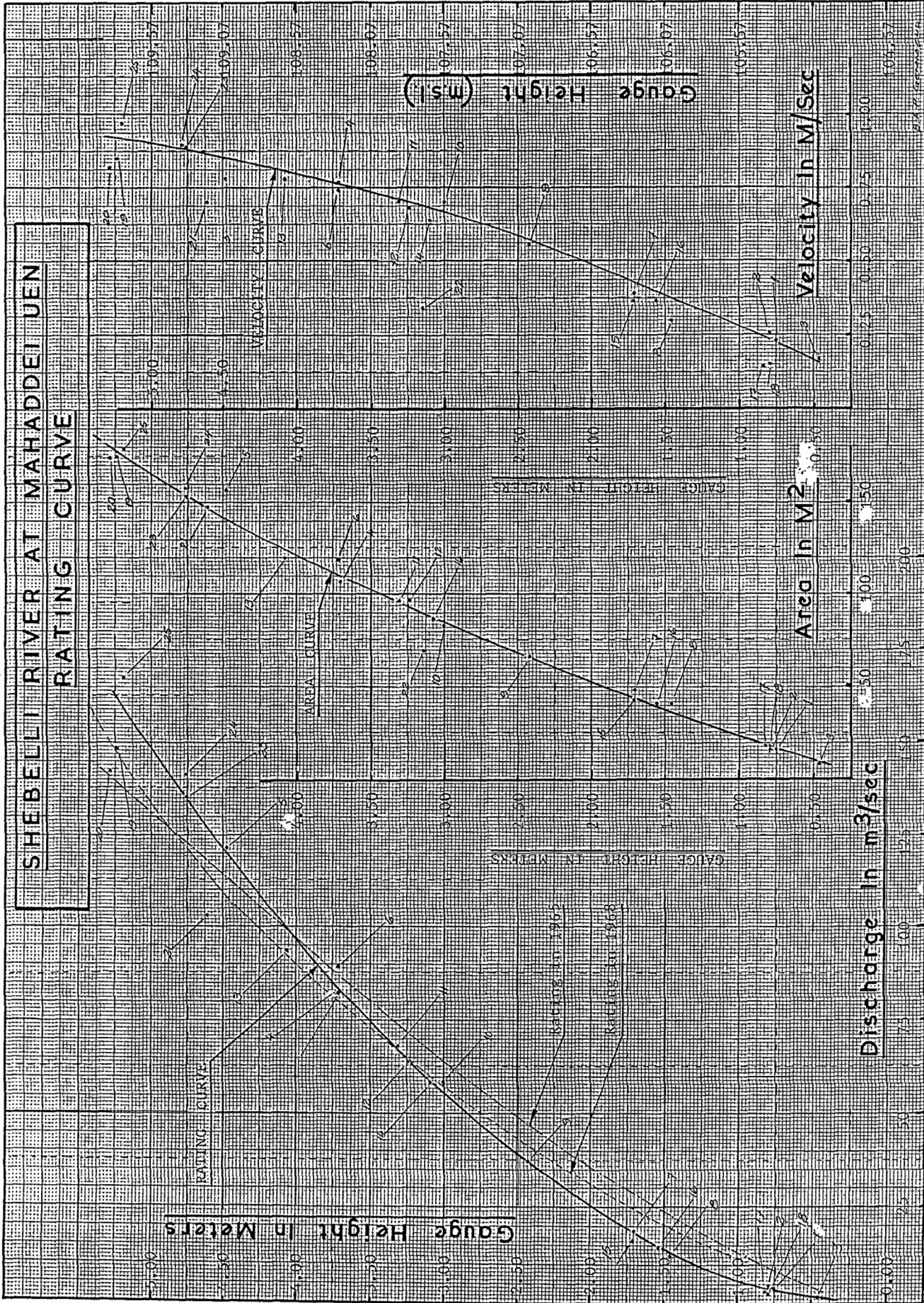
SECTION ' 3 '

SHEBELLI RIVER AT MAHADDEI UEN

1. RATING TABLE
2. RATING CURVE ( Natural Scale )
3. RATING CURVE ( Log/Log Scale )
4. CROSS SECTIONS.

# SHEBELLI RIVER AT MAHADDEI UEN

## RATING CURVE



Gauge Height In Meters

Discharge In m<sup>3</sup>/sec

Area In M<sup>2</sup>

Velocity In M/Sec

Gauge Height (m.s.l.)

RATING CURVE

AREA CURVE

VELOCITY CURVE

GAUGE HEIGHT IN METERS

GAUGE HEIGHT IN METERS

RATING FOR 1965

RATING FOR 1968

1997-57

1999-07

198-57

198-07

197-57

197-07

196-57

196-07

195-57

194-57

194-07

# THE SHEBELLI RIVER AT MAHADEI UEN

## RATING CURVE

(1980/81)

NOTE: 1) The main rating applies to free flow with regard to the Barrage situated downstream at Sabun.

2) The secondary curve relates to measurements taken at times when the Barrage gates were partially closed, the still level at the Barrage is 0.65 meters above the Gauge zero point at Mahadei Uen.

Intersection Point  
 $GH = 2.40 \text{ m}, Q = 56.04 \text{ m}^3/\text{sec}$

Affected Rating by SABUN Barrage

4.37 h 2.41

Secondary Curve

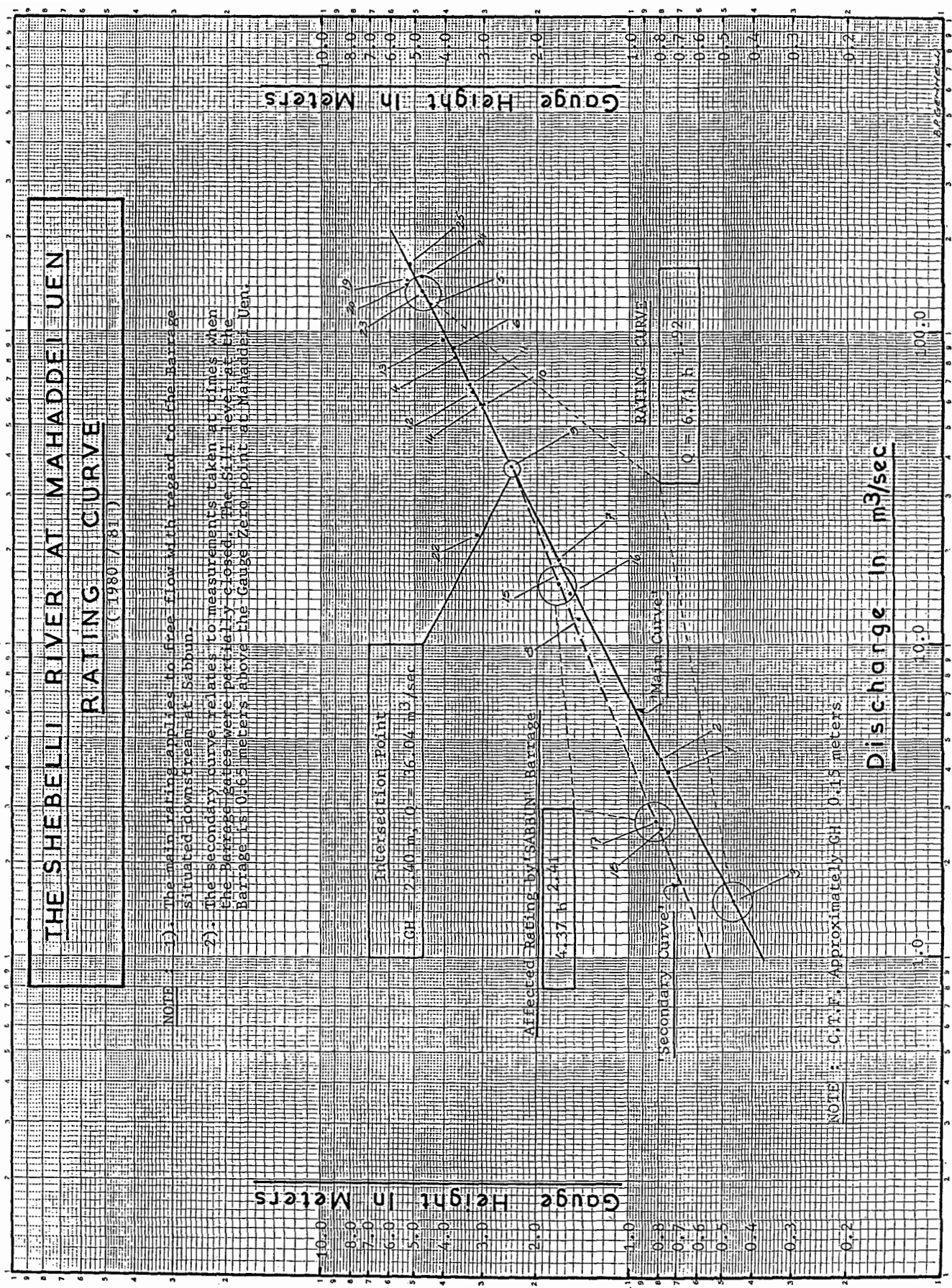
Main Curve

RATING CURVE

$Q = 6.71 \text{ h}^{-1.52}$

NOTE: C.T.F. Approximately GH 0.15 meters

Discharge in  $\text{m}^3/\text{sec}$



# SHEBELLI RIVER AT MAHADDEI UEN

## CROSS SECTIONS

(1980-7-1981)

Bridge support beam  
CH = 6.97 meters

Top of concrete bridge pier  
MSL = 109.57 meters

Top of left bank  
MSL = 109.82 meters

Bridge support beam  
CH = 6.52 meters

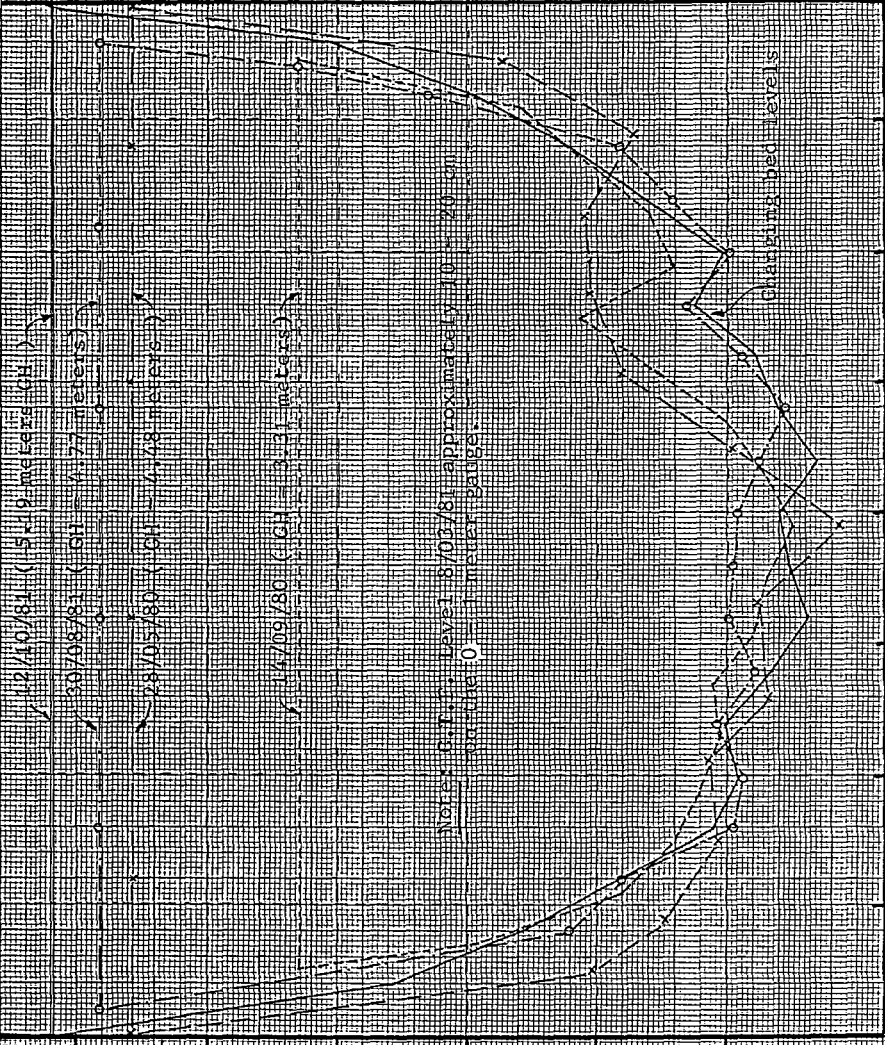
Top of protection  
flood bank  
CH = 6.09 meters

30/08/81 (CH = 6.77 meters)

28/05/80 (CH = 6.48 meters)

27/09/80 (CH = 3.1 meters)

Note: Gauge Level 8/03/81 approximately 10 - 20 cm above 0 - same as gauge.



Gauge Height in Meters

Width in Meters

5.0  
4.50  
4.00  
3.50  
3.00  
2.50  
2.00  
1.50  
1.00  
0.50  
0

5.0 10.0 15.0 20.0 25.0 30.0 35.0

Left Bank

Channel bed levels

Right Bank

Measurement of 12/10/81 (CH = 5.91 m)

Measurement of 30/08/81 (CH = 6.77 m)

Measurement of 28/05/80 (CH = 6.48 m)

Measurement of 04/09/80 (CH = 5.25 m)





SHEBELLI RIVER AT AFGOI

1. RATING TABLE
2. RATING CURVE ( Natural Scale )
3. RATING CURVE ( Log/Log Scale )
4. CROSS SECTIONS

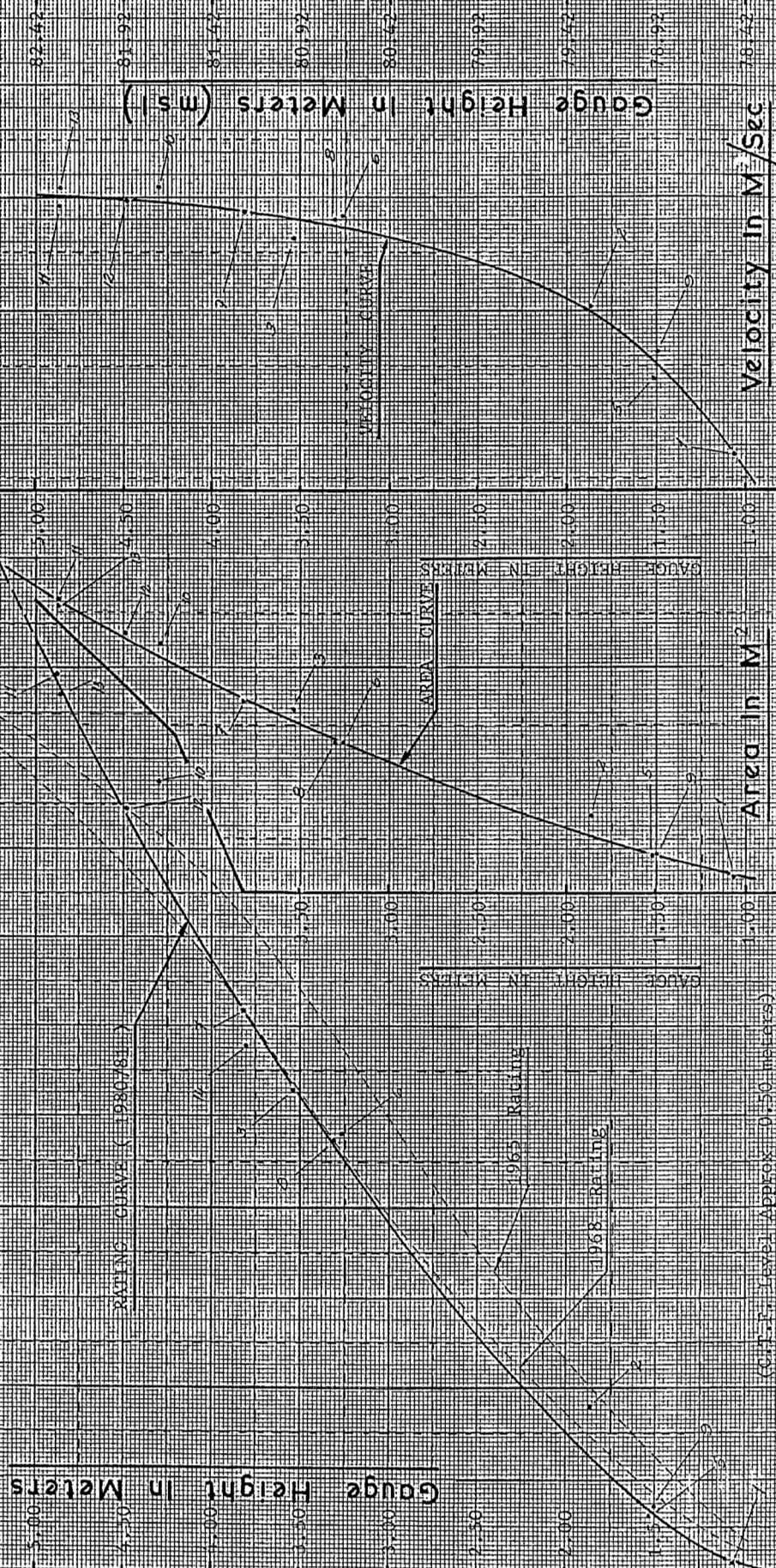
# SHEBELLI RIVER AT AFGOI

## RATING CURVE

(C.I. 980 / 1981)

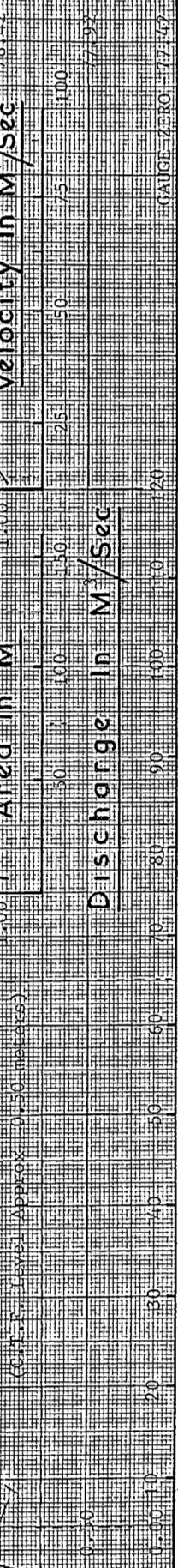
Gauge Height in Meters

Gauge Height in Meters (msl)



Discharge in M<sup>3</sup>/Sec

Velocity in M/Sec



GAUGE ZERO

# SHEBELLI RIVER AT AFGOI RATING CURVE

(1980 / 1981)

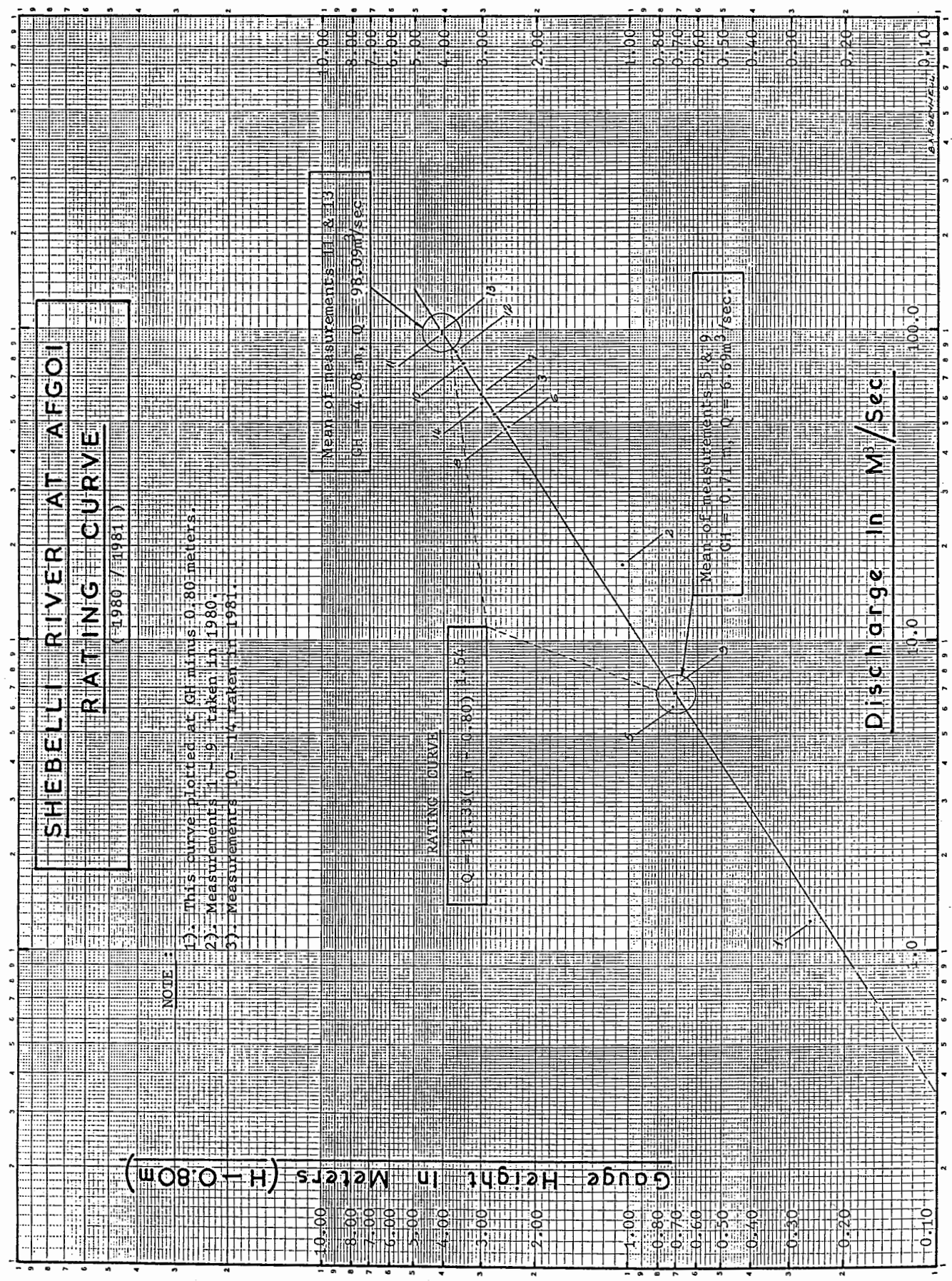
**NOTE:**

- 1) This curve plotted at  $G = \text{minus } 0.80 \text{ meters}$
- 2) Measurements 1 - 6 taken in 1980.
- 3) Measurements 10 - 14 taken in 1981.

MEAN OF MEASUREMENTS 11 & 13  
 $G = 4.08 \text{ m}$ ,  $Q = 98.09 \text{ m}^3/\text{sec}$

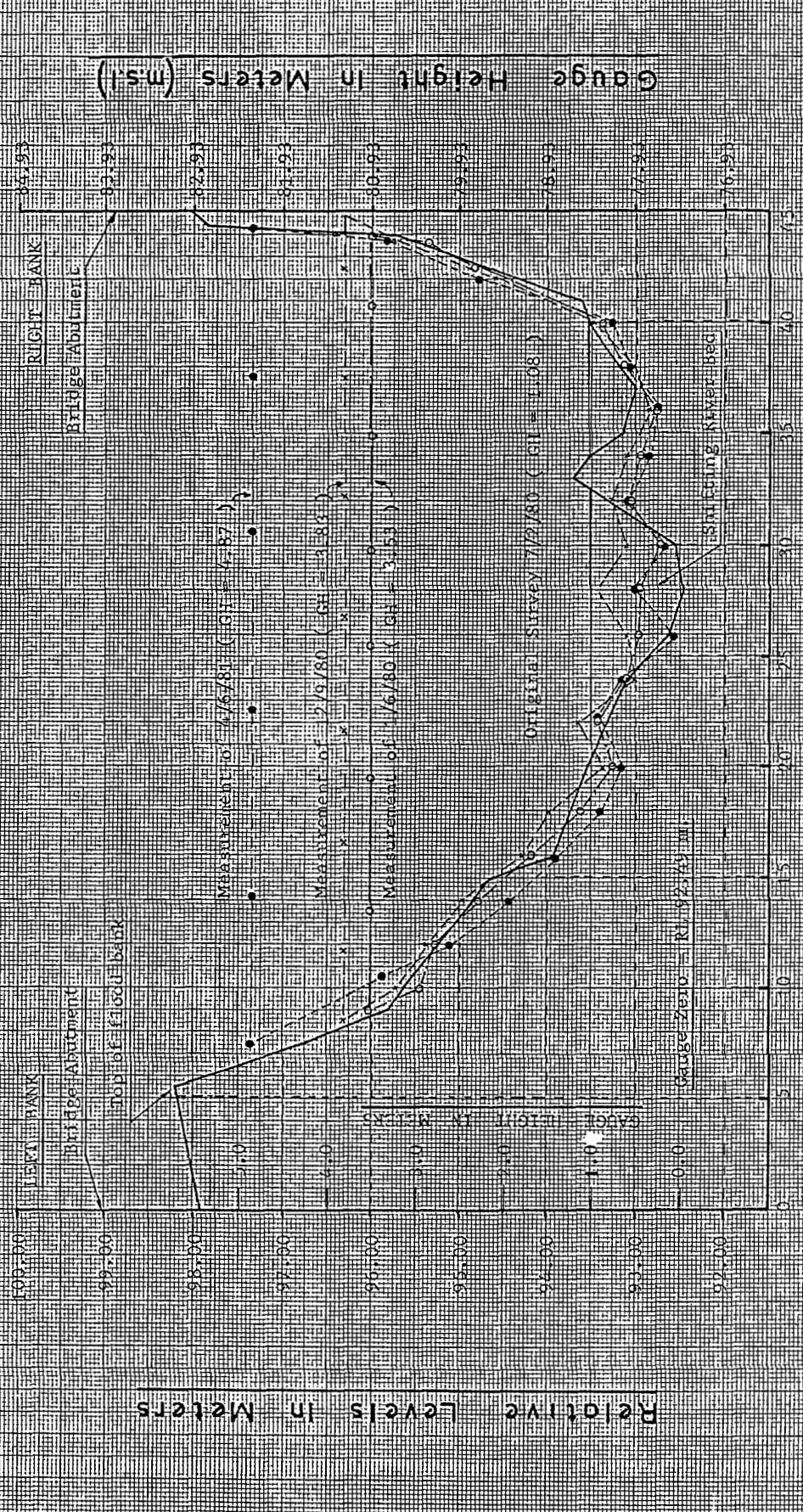
RATING CURVE  
 $Q = 11.33 (H - 0.80)^{1.54}$

MEAN OF MEASUREMENTS 5 & 9  
 $G = 0.71$ ,  $Q = 6.69 \text{ m}^3/\text{sec}$



# SHEBELLI RIVER AT AFGOI CROSS SECTION

(1980/7/1981)



Width in Meters

Relative Levels in Meters

Gauge Height in Meters (m.s.l.)

x — Discharge Measurement taken 1/6/81  
 o — Discharge Measurement taken 7/6/80  
 o — Discharge Measurement taken 1/6/80



SECTION ' 5 '

SHEBELLI RIVER AT AUDEGLE

1. RATING TABLE
2. RATING CURVE ( Natural Scale )
3. RATING CURVE ( Log/Log Scale )
4. CROSS SECTIONS

# JUBBA RIVER AT JAMAAME

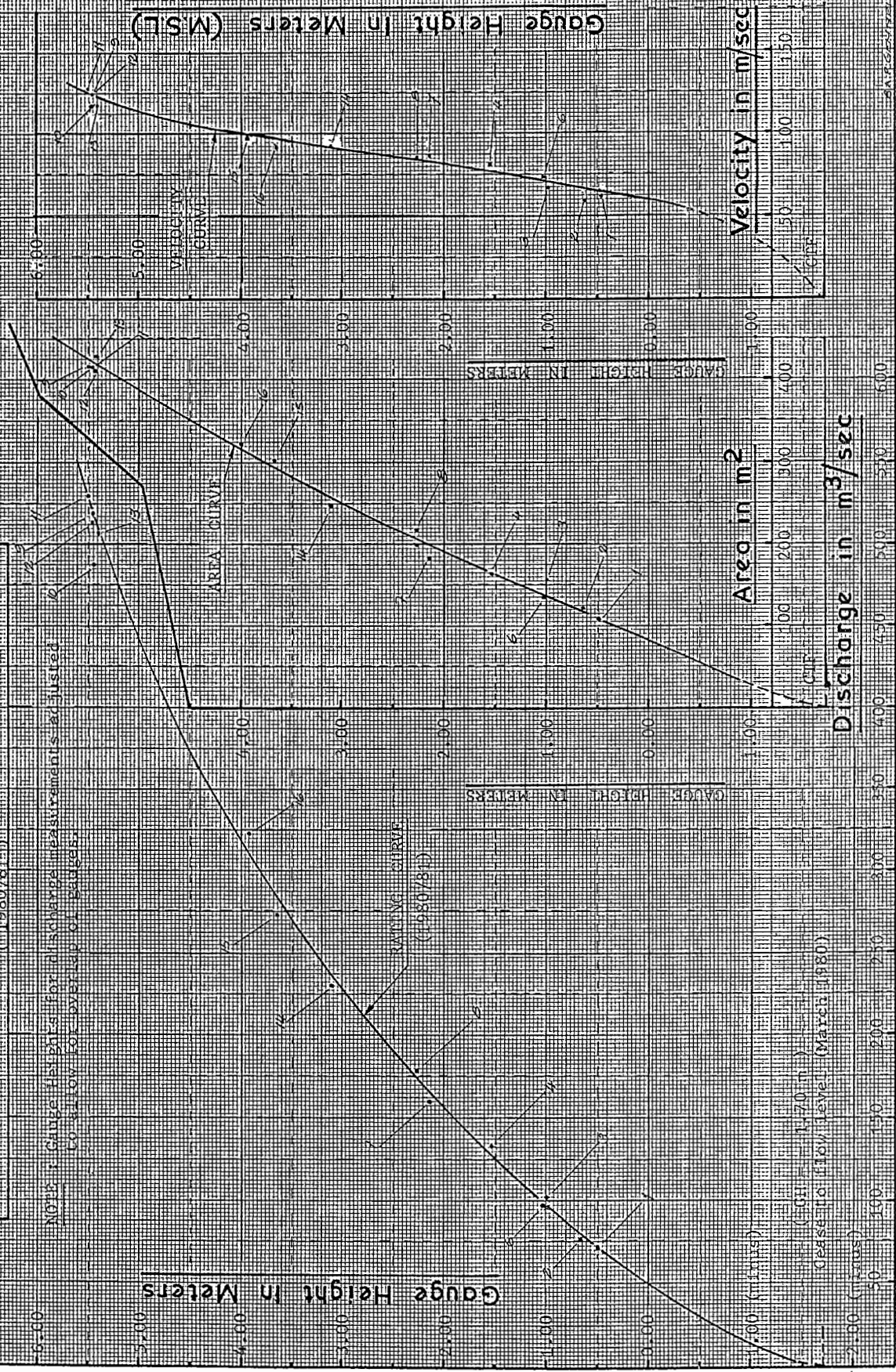
## RATING CURVES

(1980/81)

NOTE: Gauge height for discharge measurements adjusted to allow for coverage of gauges.

Gauge Height in Meters

Gauge Height in Meters (MSL)



(Not Available)

5-1-81



# JUBBA RIVER AT JAMAAME

## RATING CURVES

( 1980 / 81 )

NOTE : 1) Curve plotted at plus two meters.

2) The intersection point on the curve is approximately at the bank overflow point.

Gauge Height in Meters

Intersection point  
GH = 6.50 m, Q = 370.2 m<sup>3</sup>/second

MAIN CURVE

Q = 14.18 m<sup>3</sup>/s, h = 7.98

FLOOD CURVE

Q = 3.67 m<sup>3</sup>/s, h = 2.465

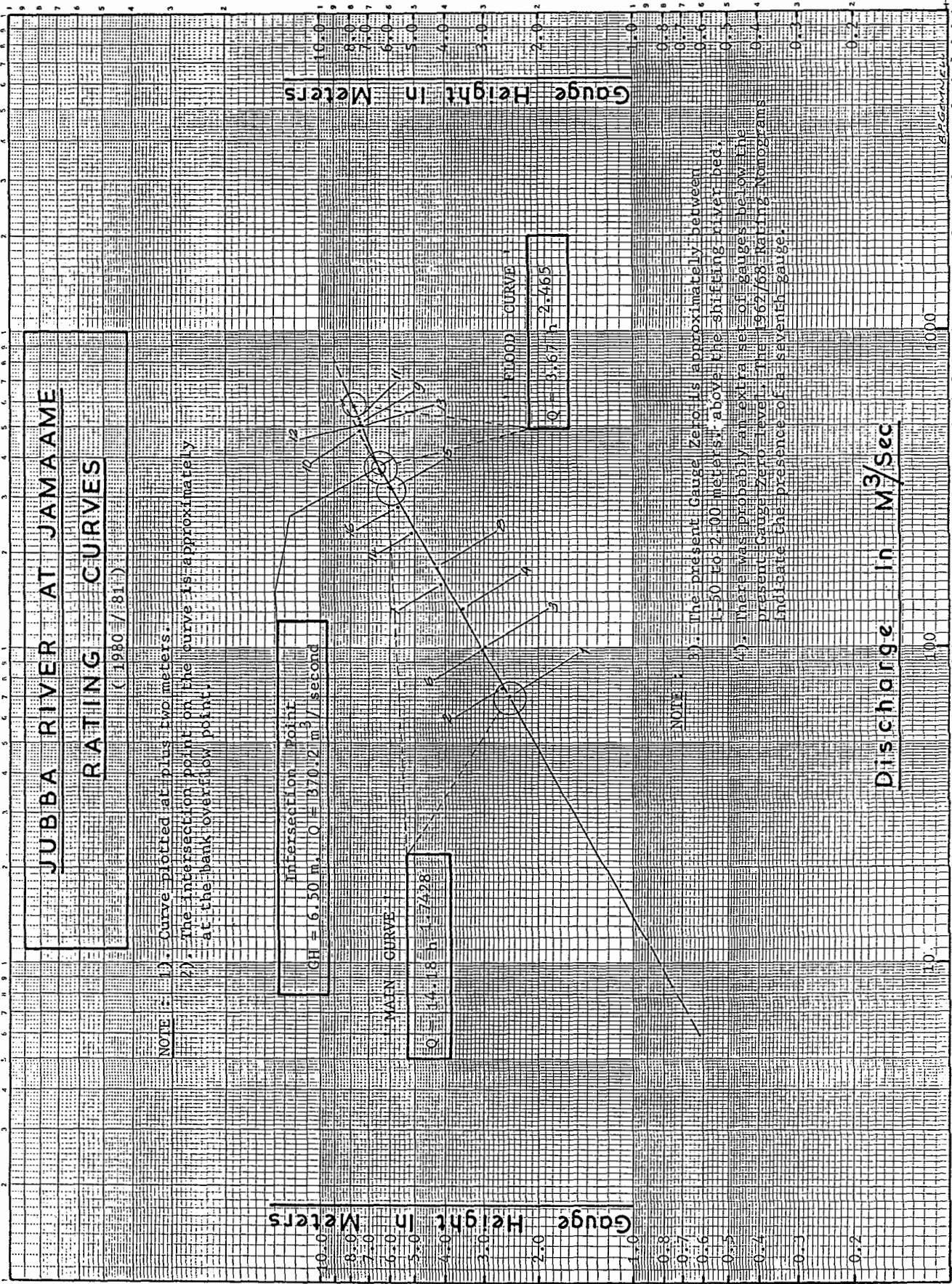
Gauge Height in Meters

NOTE :

- The present Gauge Zero is approximately between 1.50 to 2.00 meters above the shifting river bed.
- There was probably an extraneous gauge below the present Gauge Zero level, the 1967/68 Rating Monograms indicate the presence of a seventh gauge.

Discharge in M<sup>3</sup>/Sec

1000  
100  
10



# JUBBA RIVER AT JAMAAME CROSS SECTIONS

(17980/781)



Relative Levels in Meters

Width in Meters

(MSL) Levels in Meters (Not Available)

Original Survey 22-3-80 (River dry at time)

Discharge Measurement 1/20/81 (GH = 8.10m)

Discharge Measurement 8/7/81 (GH = 8.93m)

Discharge Measurement 1/7/81 (GH = 8.10m)

Bank Overflow at approximately RI Value 93.76m

Original Survey (22/03/80) River dry. With pool at time RA 86.74m

Hydro 1986

A.D. 100.00 (RI)

LEFT BANK

RIGHT BANK

Gauge Height in Meter

Gauge Zero

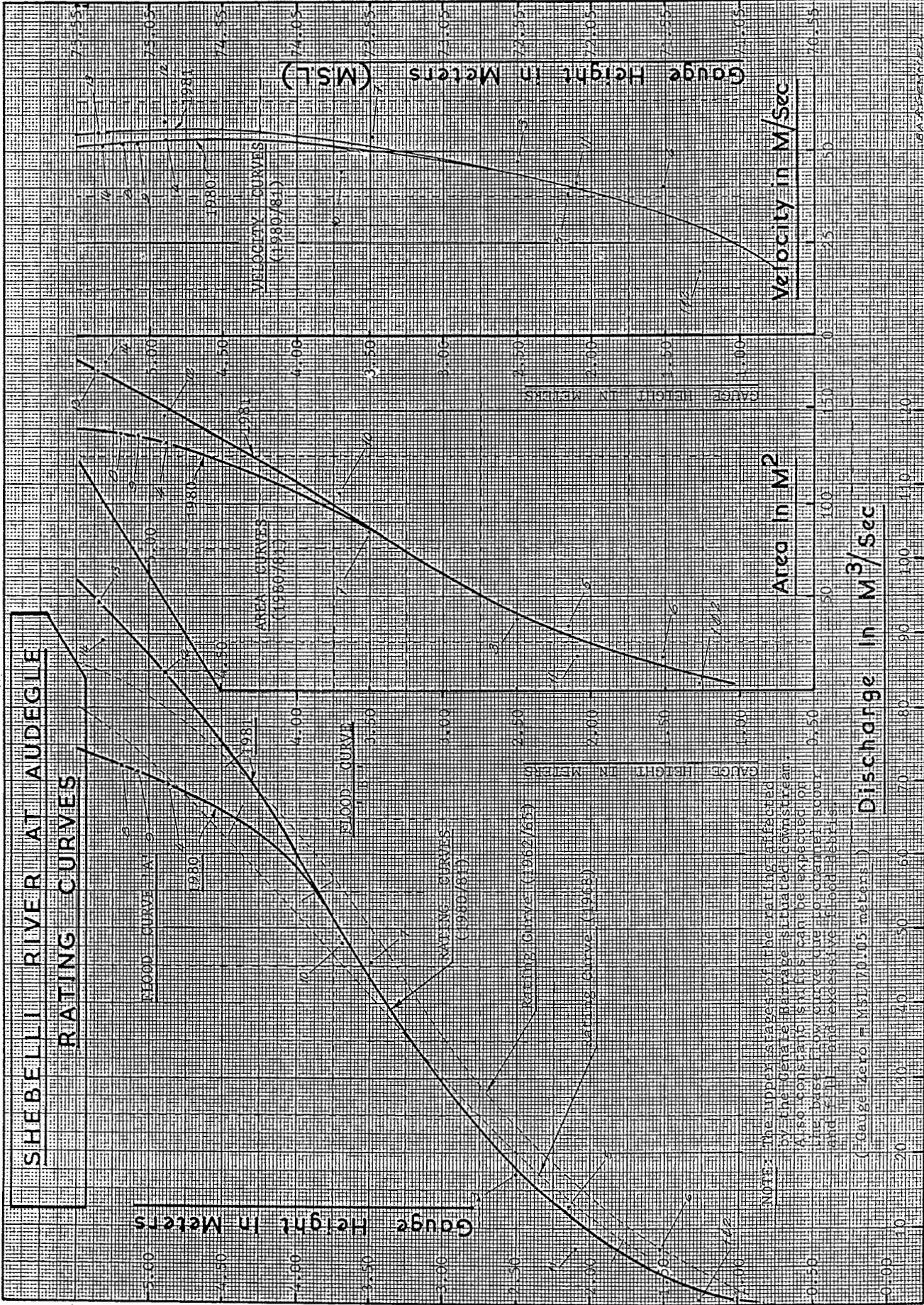
Shifting Sand Bed

Silt deposits



# SHEBEILI RIVER AT AUDEGIE

## RATING CURVES



NOTE: The upper stages of the rating affected by the Genale Barrage situated downstream. Also, considerable fluctuations can be expected in the base flow curve due to channel siltation and high and excessive flood debris.

(Gauge zero = MSL 70.05 meters.)

# SHEBELLI RIVER AT AUDEGLE

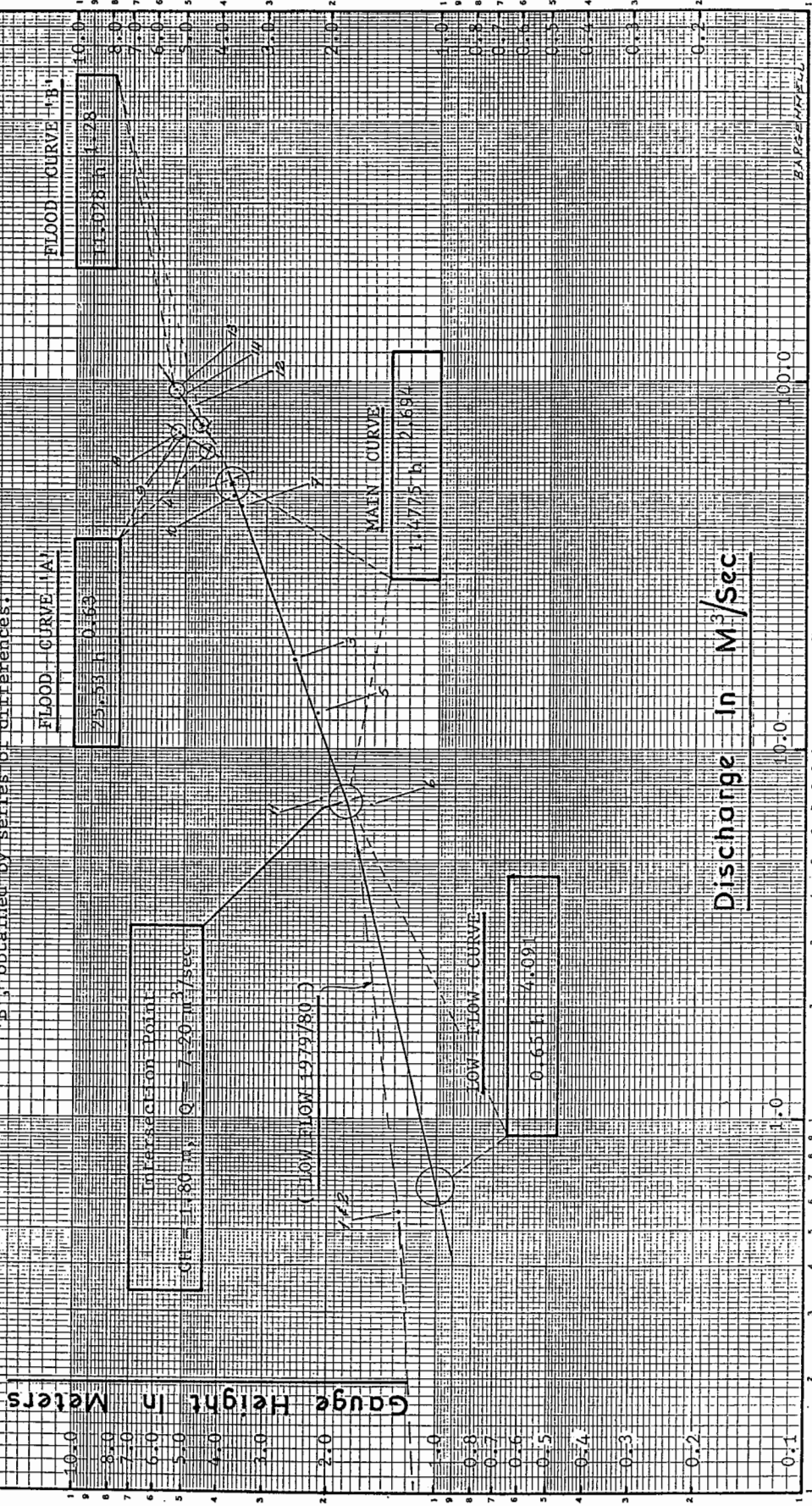
## RATING CURVE

1980 / 81

NOTE: 1) The upper part of the curve affected by the Genale barrage situated b/s.

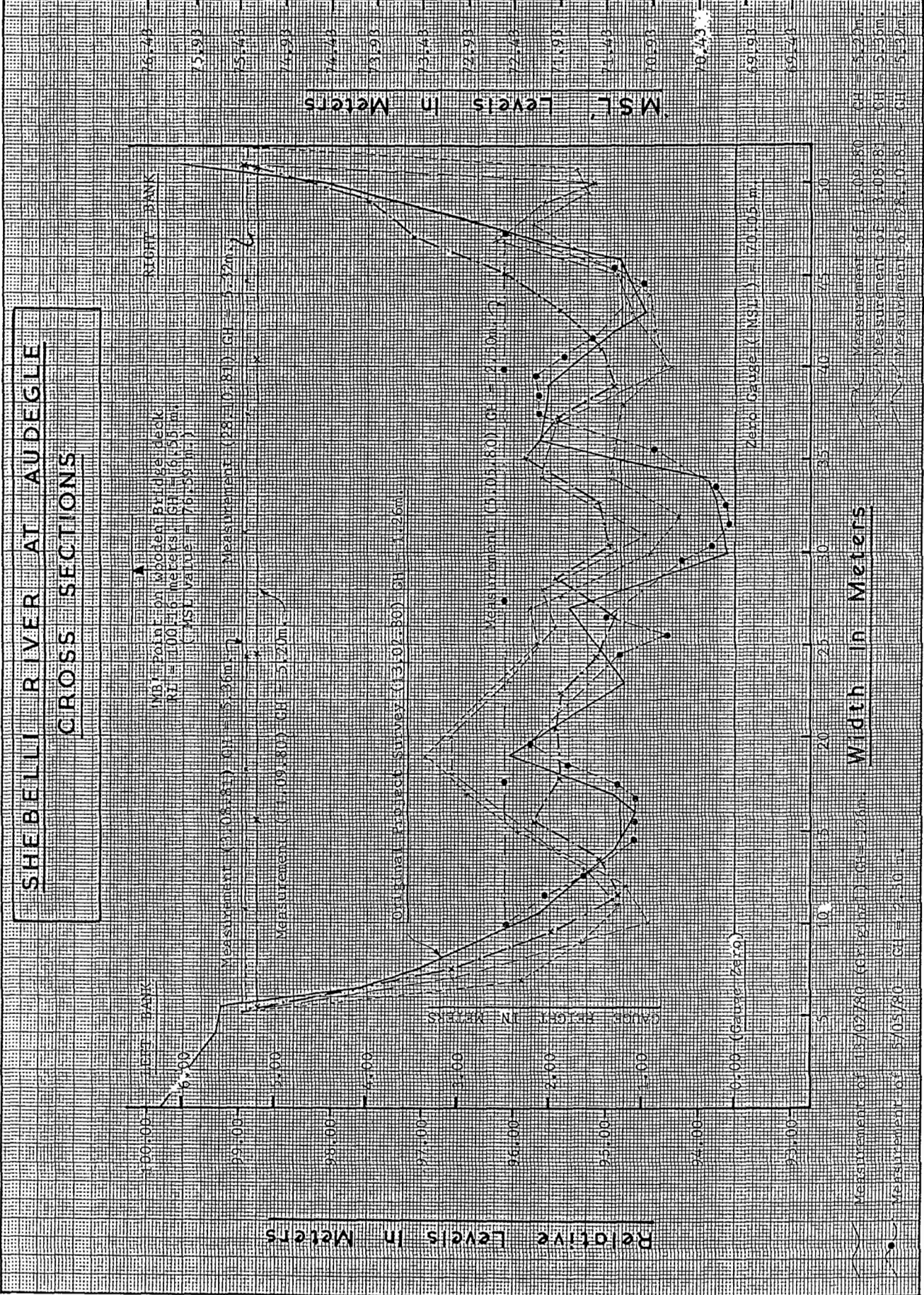
2) The section of the curves between Gt. 3.75 on the main curve and Gt. 4.50 on flood curve 'A', and Gt. 4.50 on flood curve 'B', obtained by series of differences.

Gauge Height in Meters



BA Res. M. P. 22

# SHEBELLI RIVER AT AUDEGIE CROSS SECTIONS









JUBBA RIVER AT LUGH GANANA

1. RATING TABLE
2. RATING CURVE ( Natural Scale )
3. RATING CURVE ( Log/Log Scale )
4. CROSS SECTIONS

# JUBBA RIVER AT LUGH GANANA RATING CURVE

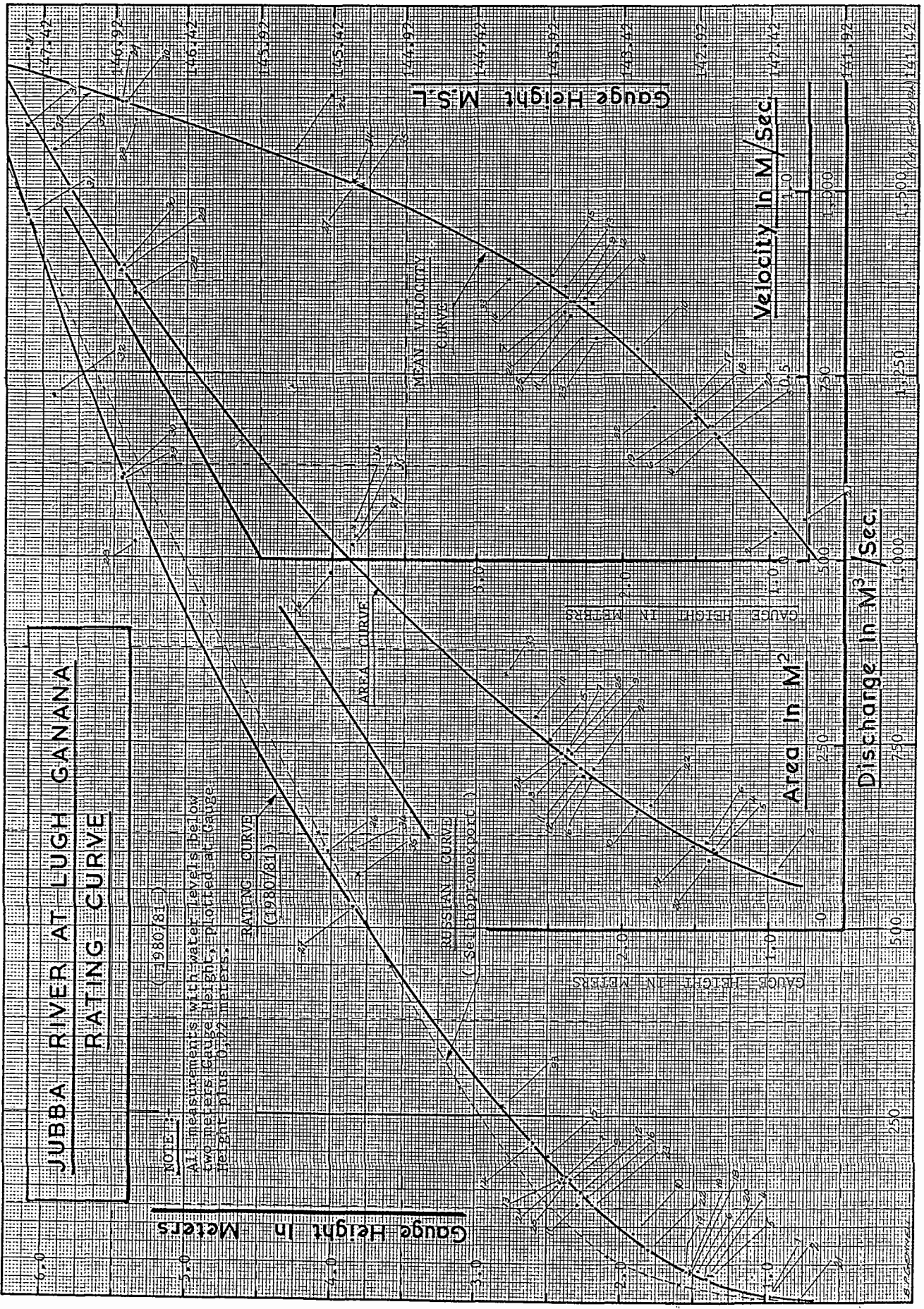
NOTE:  
(1980/81)  
All measurements with water levels below  
two meters gauge height, plotted at gauge  
height plus 0.22 meters.

RATING CURVE  
(1980/81)

RUSSIAN CURVE  
(1-181980-08-08-08-08)

AREA CURVE

MEAN VELOCITY  
CURVE



# JUBBA RIVER AT LUGH GANANA

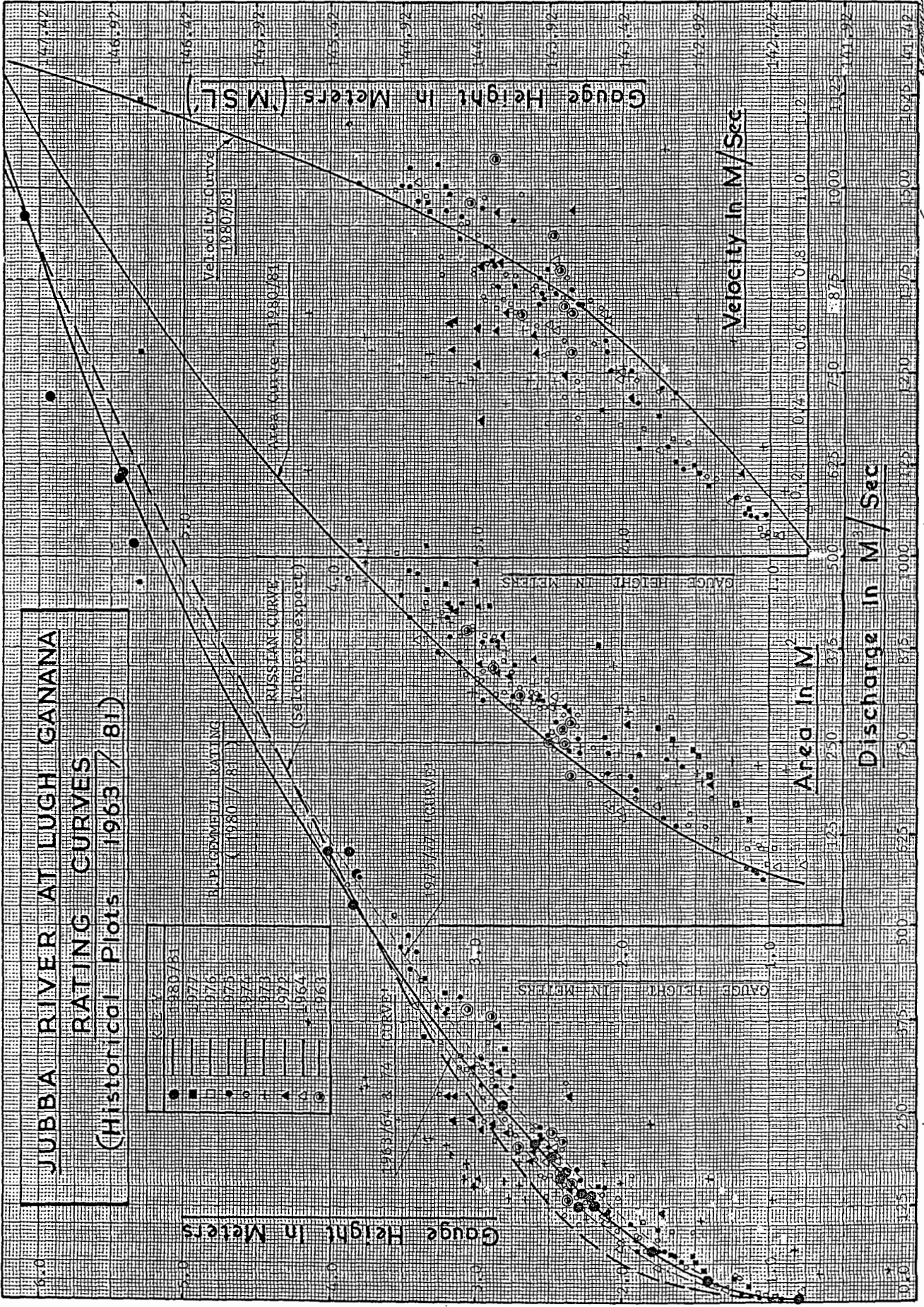
## RATING CURVES

(Historical Plots 1963 / 81)

Year	Symbol
1980/81	●
1977	■
1976	□
1975	○
1974	△
1973	▽
1972	◇
1964	◇
1963	◇

Gauge Height in Meters

Gauge Height in Meters (MSL)



Discharge in M<sup>3</sup>/Sec

Velocity in M/Sec

Area in M<sup>2</sup>

Gauge Height in Meters

Gauge Height in Meters

# JUBBA RIVER AT LUGH GANANA RATING CURVE

(1980, 1981)

- NOTE:
- 1). All levels below 2.0 meters plotted GH F 0.22 meters.
  - 2). Discharge measurements No. 1 to 20 refer to 1980, and 21 to 35 refer to 1981.

Intersection point  
GH = 2.66 m, Q = 1236 m<sup>3</sup>/sec.

Intersection point  
GH = 1.325, Q = 28.44 m<sup>3</sup>/sec.

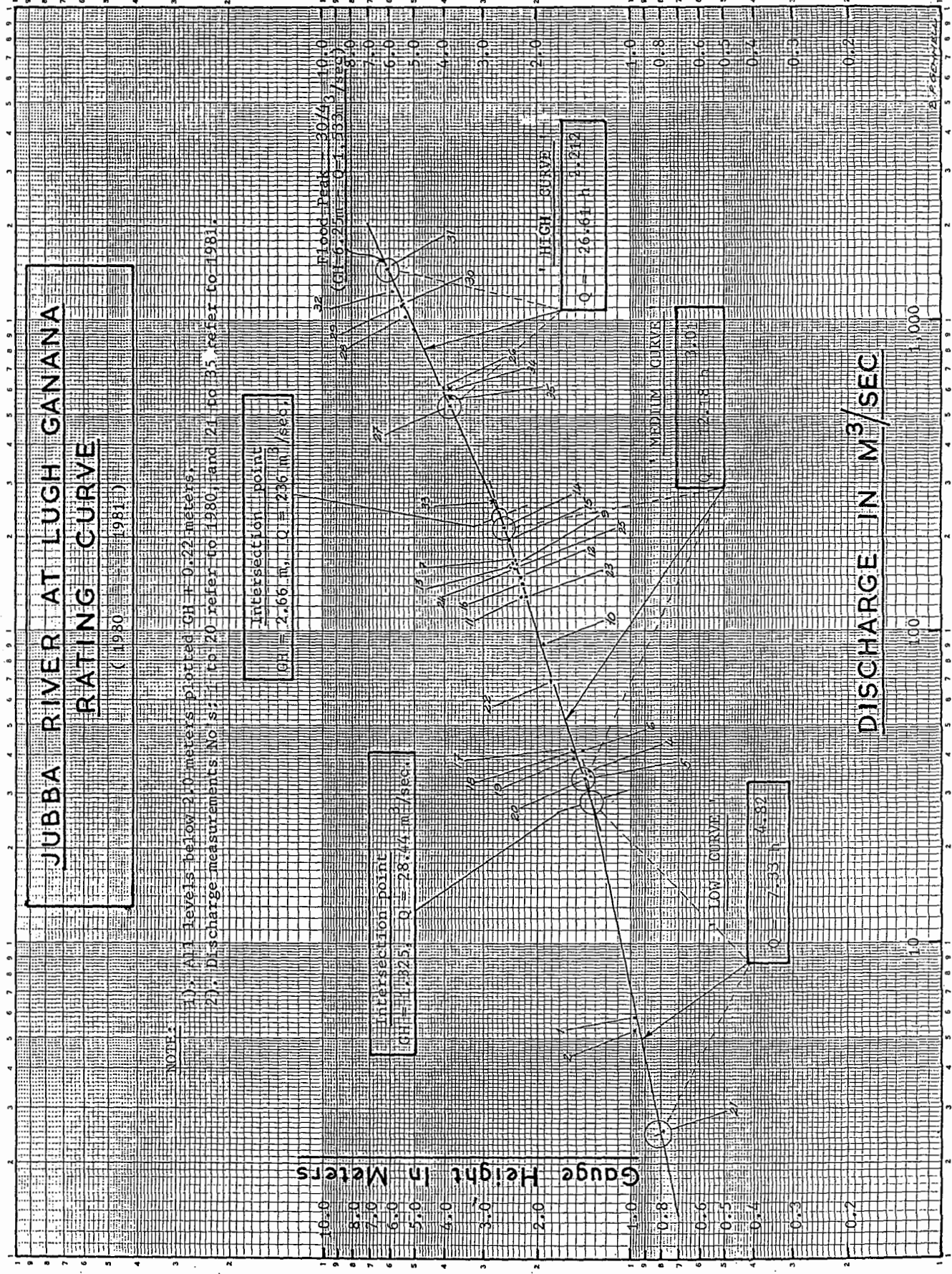
Intersection point  
GH = 26.61 m, Q = 9.212

Intersection point  
GH = 7.33, Q = 4.82

Intersection point  
GH = 2.83, Q = 3.0

Gauge Height in Meters

DISCHARGE IN M<sup>3</sup>/SEC

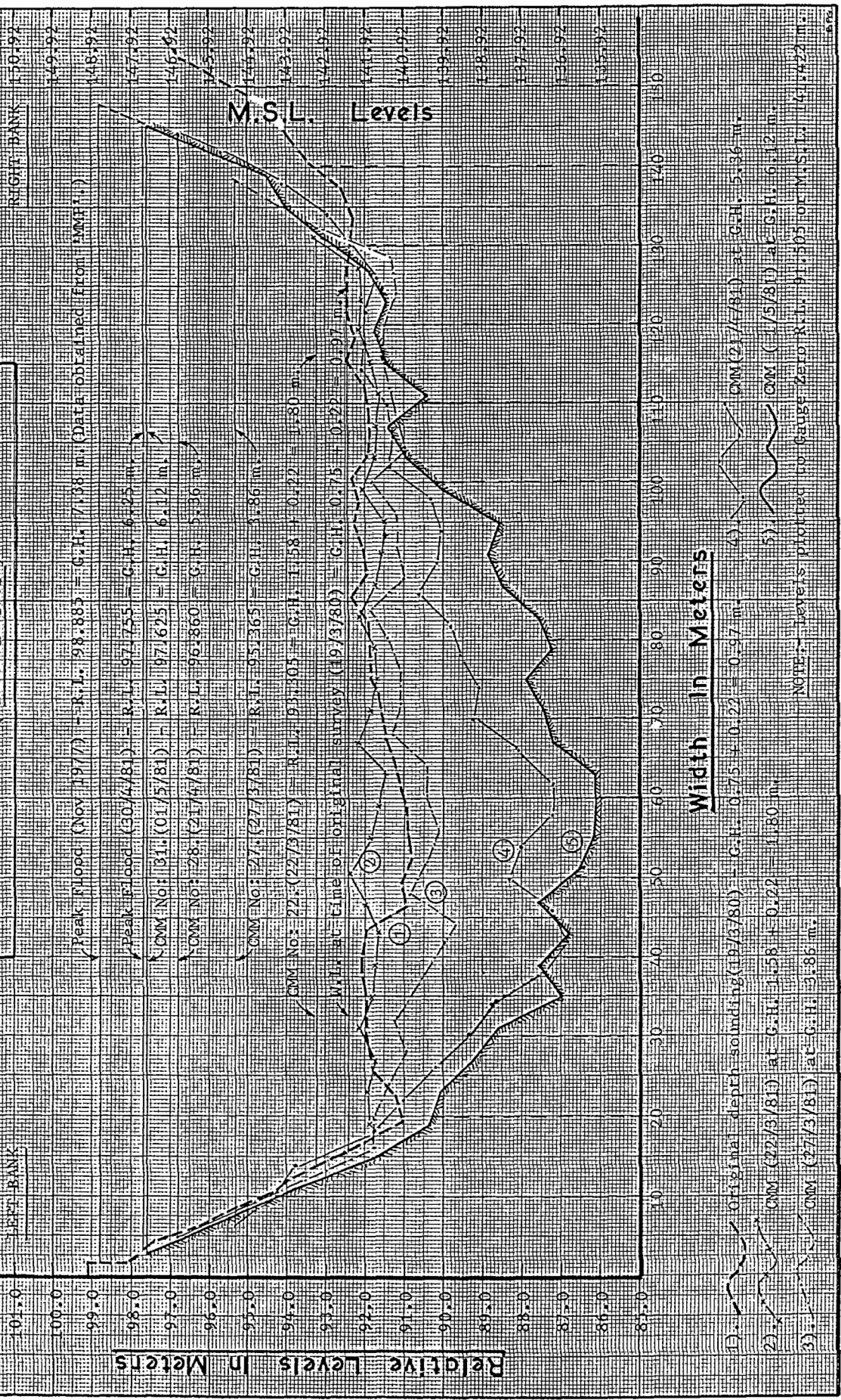


E. S. GAWALE

# JUBBA RIVER AT LUGH GANANA

## CROSS SECTIONS

(1980 & 1981)



### Width In Meters

- 1) Original depth soundings (19/3/80) - C.H. 10.75 ± 0.22 = 0.57 m. (3)
- 2) C.M. (22/3/81) at C.H. 11.58 ± 0.22 = 1.80 m. (5)
- 3) W.L. at time of original survey (19/3/80) - C.H. 10.75 ± 0.22 = 0.97 m. (4)

NOTE: Levels plotted to Causeway R.L. 91.505 for M.S.L. (1982) m.



SECTION ' 7 '

JUBBA RIVER AT BARDHEERE

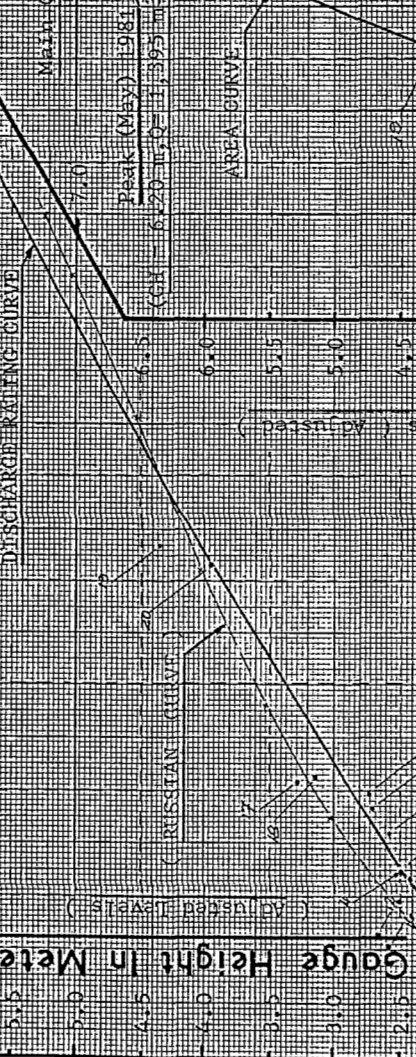
1. RATING TABLE
2. RATING CURVE ( Natural Scale )
3. RATING CURVE ( Log/Log Scale )

# JUBBA RIVER AT BARDHEERE

## RATING CURVE

1980 (7/81)

NOTE: 1) Rating Curve plotted at Gauge Height plus one meter to avoid negative gauge height.  
 2) MSL Level indicated, relate to actual gauge levels.  
 DISCHARGE RATING CURVE

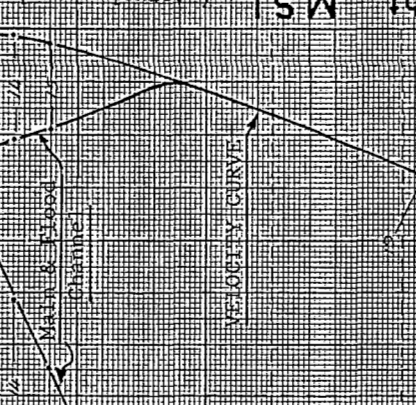


NOTE: 1) MSL Level referred to the actual gauge level. On this chart they refer to the discharge curve and not the Area or Velocity curves.  
 2) On this graph zero gauge is equal to adjusted gauge height 1.0 meters.

1981 (Q)

1977 (Nov)

1977 (Q)

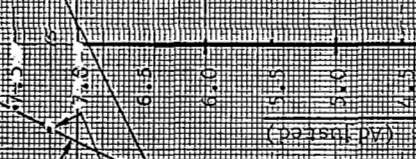


NOTE: 1) MSL Level referred to the actual gauge level. On this chart they refer to the discharge curve and not the Area or Velocity curves.  
 2) On this graph zero gauge is equal to adjusted gauge height 1.0 meters.

1977 (Q)

1977 (Nov)

1977 (Q)



NOTE: 1) MSL Level referred to the actual gauge level. On this chart they refer to the discharge curve and not the Area or Velocity curves.  
 2) On this graph zero gauge is equal to adjusted gauge height 1.0 meters.



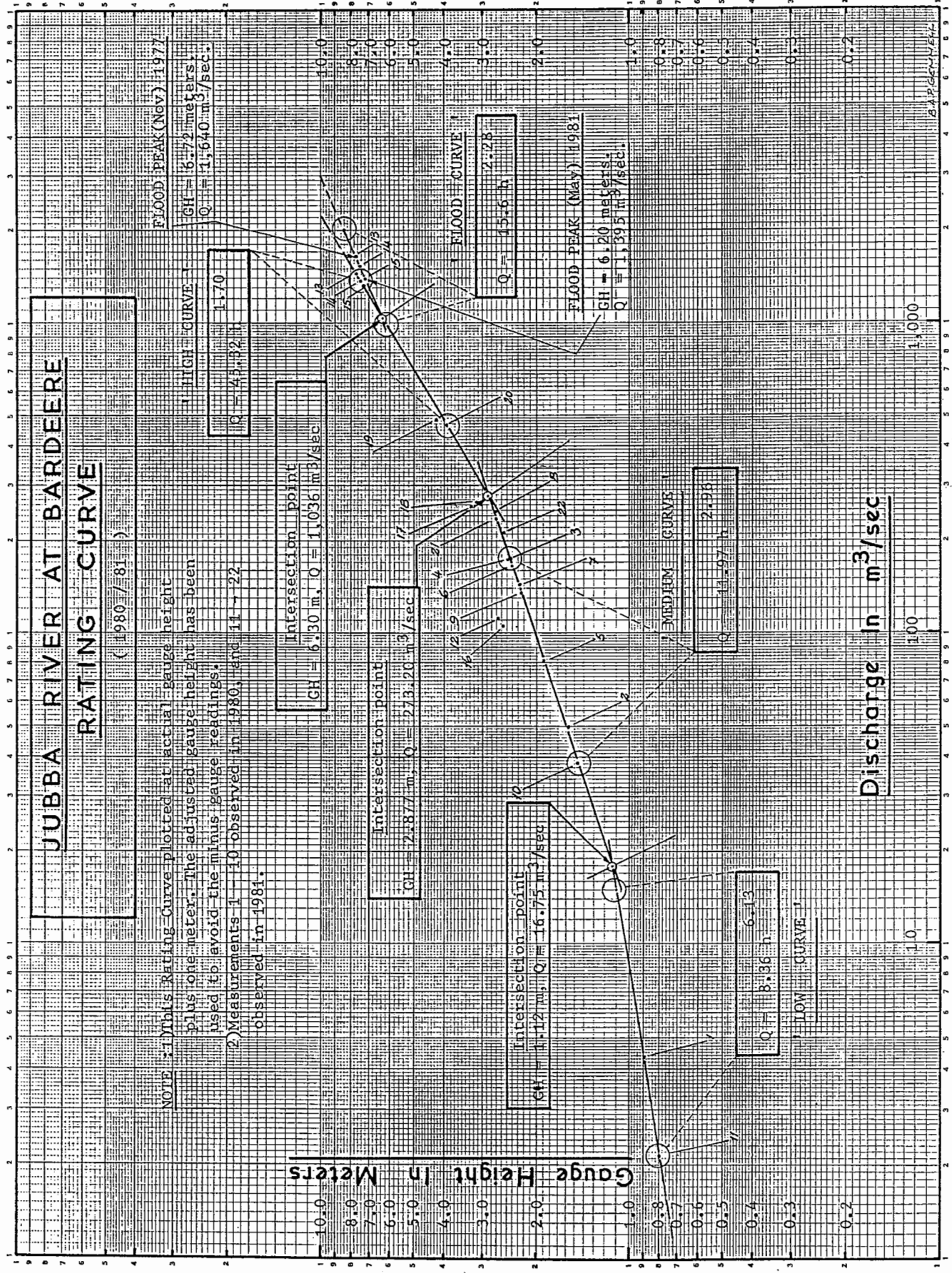
# JUBBA RIVER AT BARDEERE RATING CURVE

(1980/81)

NOTE: 1) This Rating Curve plotted at actual gauge height plus one meter; the adjusted gauge height has been used to avoid the minus gauge readings.  
2) Measurements 1-10 observed in 1980, and 11-22 observed in 1981.

Gauge Height in Meters

Discharge in m<sup>3</sup>/sec



# JUBBA RIVER AT BARDHEERE

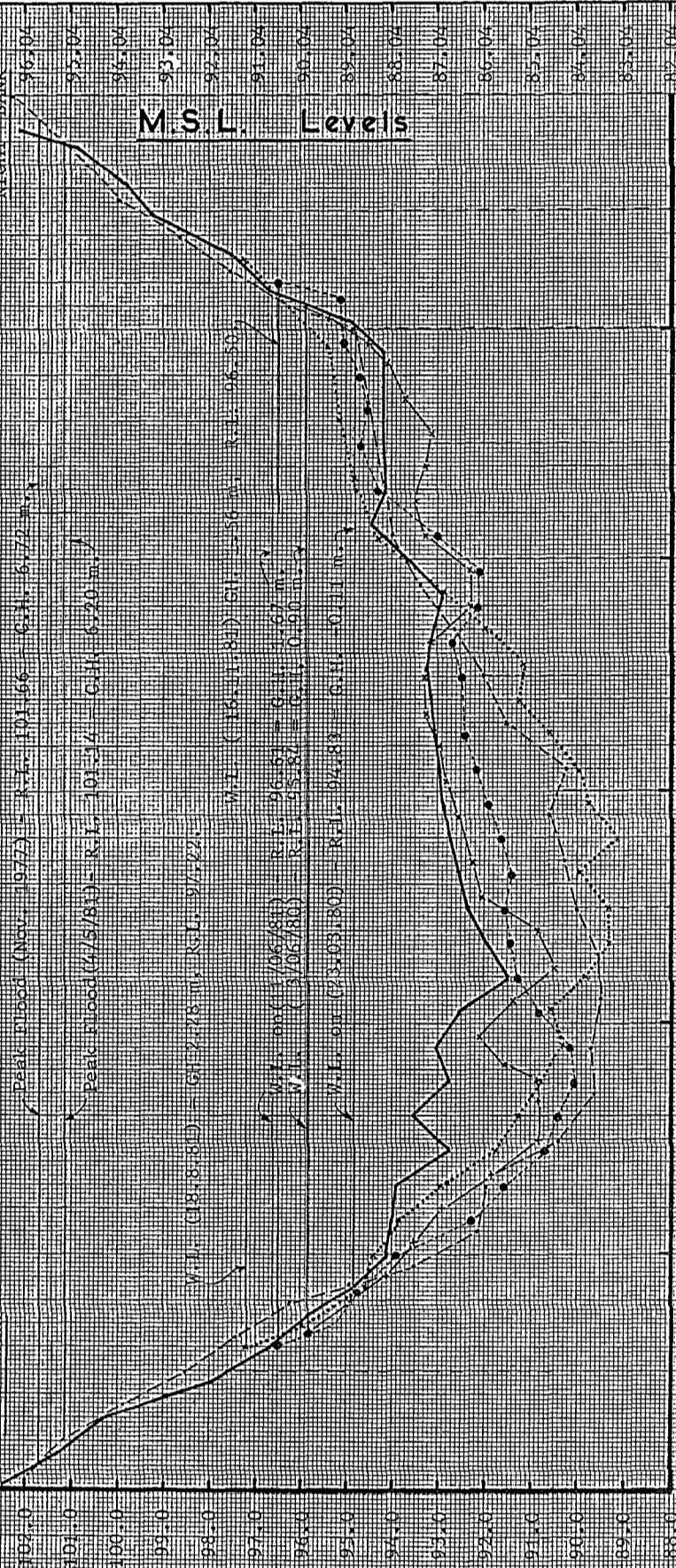
## CROSS SECTIONS

(1980 - 8 - 1981)

NOTE: Soundings taken from D/S side of D-1388 S. Devalik. Large shift in bed level 50 m or so conditions observed at high. During peak flood the sound would have towered the bed level a few meters more.

LEFT BANK

RIGHT BANK



Relative Levels in Meters

M.S.L. Levels

Width in Meters

Original section surveyed March 1980. Gauging of November 1981.  
 Cross-section from CVM measurement taken 3/06/80 (after initial 60m floods). Gauging of August 1981.  
 Cross-section from CVM measurement taken 11/06/80 on Flood Regression after extreme flood of 4/05/81.

# RATING TABLE (M<sup>3</sup>/Sec)

River: J U B B A Location: B A R D H E R E Period: JANUARY 1980 TO DECEMBER 1981

M.S.L.	G.H.	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	M.S.L.	G.H.	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
88.48	0.50	0.12	0.13	0.15	0.17	0.19	0.21	0.24	0.27	0.29	0.33	92.48	3.50	584.5	586.7	588.9	591.1	593.3	595.5	597.8	600.0	602.2	604.2
88.58	0.40	0.36	0.40	0.44	0.49	0.53	0.60	0.66	0.73	0.80	0.87	92.58	3.60	606.7	609.0	611.3	613.5	615.8	618.0	620.3	622.5	624.8	627.1
88.68	0.30	0.94	1.03	1.12	1.21	1.32	1.43	1.55	1.68	1.82	1.97	92.68	3.70	629.3	631.5	633.7	636.0	638.2	640.7	643.0	645.3	647.6	649.9
88.78	0.20	2.13	2.30	2.48	2.67	2.87	3.09	3.32	3.56	3.82	4.09	92.78	3.80	652.2	654.5	656.8	659.2	661.5	663.8	666.1	668.5	670.8	673.1
88.88	0.10	4.38	4.69	5.01	5.36	5.72	6.10	6.51	6.94	7.39	7.86	92.88	3.90	675.5	677.8	680.1	682.5	684.9	687.3	689.7	692.0	694.4	696.6
88.98	0.00	8.36	8.89	9.44	10.0	10.6	11.2	12.0	12.7	13.4	14.2	92.98	4.00	699.1	701.5	703.9	706.3	708.6	711.0	713.4	715.8	718.2	720.6
89.08	0.10	14.9	15.9	16.8	17.2	17.6	18.1	18.6	19.1	19.5	20.0	93.08	4.10	723.0	725.4	727.8	730.3	732.7	735.1	737.6	740.0	742.4	744.8
89.18	0.20	20.5	21.0	21.6	22.1	22.6	23.2	23.7	24.3	24.7	25.4	93.18	4.20	747.3	749.8	752.3	754.7	757.1	759.6	762.0	764.5	767.0	769.5
89.28	0.30	26.0	26.6	27.2	27.8	28.5	29.1	29.7	30.4	31.0	31.7	93.28	4.30	771.9	774.4	776.9	779.3	781.8	784.3	786.8	789.3	791.8	794.3
89.38	0.40	32.4	33.1	33.8	34.5	35.2	36.0	36.7	37.4	38.2	39.0	93.38	4.40	796.8	799.3	801.8	804.4	806.9	809.4	811.9	814.5	817.0	819.5
89.48	0.50	39.8	40.5	41.3	42.2	43.0	43.8	44.6	45.5	46.4	47.2	93.48	4.50	822.1	824.5	827.0	829.7	832.2	834.8	837.4	840.0	842.0	847.0
89.58	0.60	48.1	49.0	49.9	50.8	51.8	52.7	53.7	54.6	55.6	56.6	93.58	4.60	847.6	850.2	852.8	855.4	857.9	860.3	863.1	865.7	868.3	870.9
89.68	0.70	57.6	58.6	59.7	60.7	61.7	62.7	63.8	64.9	66.0	67.1	93.68	4.70	873.5	876.1	878.4	881.4	884.0	886.6	889.2	891.8	894.4	897.8
89.78	0.80	68.2	69.3	70.6	71.6	72.8	74.0	75.1	76.3	77.5	78.9	93.78	4.80	899.7	902.4	905.1	907.7	910.3	913.0	915.6	918.3	921.0	923.7
89.88	0.90	80.0	81.3	82.5	83.8	85.1	86.4	87.7	89.1	90.4	91.8	93.88	4.90	926.3	929.0	931.7	934.3	936.9	939.7	942.4	945.0	947.7	951.1
89.98	1.00	93.1	94.5	95.9	97.3	98.8	100.2	101.7	103.1	104.6	106.1	93.98	5.00	953.1	955.8	958.5	961.2	964.0	966.7	969.4	972.1	974.8	977.6
90.08	1.10	107.6	109.1	110.7	112.3	113.8	115.4	117.0	118.6	120.2	121.8	94.08	5.10	980.5	983.0	985.7	988.8	991.2	994.0	996.8	999.5	1,003	1,005
90.18	1.20	123.5	125.2	126.9	128.6	130.3	132.0	133.7	135.5	137.3	139.1	94.18	5.20	1,008	1,011	1,013	1,016	1,018	1,022	1,025	1,027	1,030	1,033
90.28	1.30	140.9	142.7	144.5	146.4	148.2	150.1	152.0	153.9	155.9	157.8	94.28	5.30	1,036	1,040	1,044	1,047	1,051	1,055	1,059	1,063	1,067	1,071
90.38	1.40	159.8	161.8	163.8	165.9	167.8	169.8	171.8	173.9	175.9	178.2	94.38	5.40	1,075	1,079	1,083	1,086	1,090	1,094	1,098	1,102	1,105	1,109
90.48	1.50	180.3	182.4	184.8	186.8	189.0	191.2	193.4	195.7	197.7	200.1	94.48	5.50	1,113	1,117	1,121	1,125	1,129	1,133	1,137	1,141	1,145	1,149
90.58	1.60	202.0	203.6	205.2	206.8	208.4	210.0	211.6	213.2	214.8	216.4	94.58	5.60	1,153	1,157	1,161	1,165	1,169	1,173	1,177	1,181	1,185	1,189
90.68	1.70	218.0	219.9	221.8	223.7	225.6	227.5	229.4	231.3	233.2	235.1	94.68	5.70	1,193	1,197	1,201	1,205	1,209	1,213	1,217	1,221	1,226	1,230
90.78	1.80	237.0	238.9	240.8	242.7	244.6	246.5	248.4	250.3	252.2	254.1	94.78	5.80	1,234	1,238	1,242	1,246	1,251	1,255	1,259	1,263	1,267	1,271
90.88	1.90	257.0	259.0	261.0	263.0	265.0	267.0	268.0	269.0	271.0	273.0	94.88	5.90	1,276	1,280	1,284	1,288	1,293	1,297	1,301	1,305	1,310	1,314
90.98	2.00	277.0	279.0	281.0	283.0	285.0	287.0	289.0	291.0	293.0	295.0	94.98	6.00	1,318	1,322	1,327	1,331	1,336	1,340	1,344	1,349	1,353	1,357
91.08	2.10	297.0	299.1	301.2	303.2	305.4	307.5	309.6	311.7	313.8	315.9	95.08	6.10	1,361	1,365	1,370	1,375	1,379	1,383	1,388	1,392	1,397	1,401
91.18	2.20	318.0	319.9	321.8	323.7	325.6	327.5	329.4	331.3	333.2	335.1	95.18	6.20	1,406	1,410	1,415	1,419	1,423	1,428	1,432	1,437	1,441	1,446
91.28	2.30	337.0	339.1	341.2	343.3	345.4	347.5	349.6	351.7	353.8	355.9	95.28	6.30	1,450	1,454	1,459	1,464	1,469	1,473	1,478	1,482	1,487	1,491
91.38	2.40	358.0	360.3	362.7	365.0	367.3	369.7	372.0	374.3	376.6	379.0	95.38	6.40	1,496	1,500	1,505	1,510	1,515	1,519	1,523	1,528	1,533	1,538
91.48	2.50	381.3	383.1	384.9	386.8	388.6	390.6	392.1	394.3	396.5	398.2	95.48	6.50	1,543	1,548	1,552	1,557	1,561	1,566	1,570	1,575	1,580	1,585
91.58	2.60	400.0	401.9	403.8	405.6	407.5	409.4	411.3	413.3	415.3	417.3	95.58	6.60	1,590	1,595	1,600	1,604	1,609	1,614	1,619	1,623	1,628	1,633
91.68	2.70	419.0	420.9	422.8	424.8	426.7	428.7	430.7	432.6	434.5	436.4	95.68	6.70	1,638	1,643	1,648	1,653	1,657	1,662	1,667	1,672	1,677	1,682
91.78	2.80	438.5	440.5	442.5	444.4	446.4	448.3	450.3	452.3	454.3	456.3	95.78	6.80	1,687	1,692	1,697	1,702	1,707	1,712	1,717	1,722	1,727	1,732
91.88	2.90	458.3	460.3	462.3	464.3	466.3	468.3	470.3	472.3	474.3	476.3	95.88	6.90	1,737	1,741	1,746	1,752	1,757	1,762	1,767	1,772	1,777	1,782
91.98	3.00	478.4	480.8	482.9	484.9	487.0	488.6	490.7	492.7	494.8	496.8	95.98	7.00	1,787									
92.08	3.10	498.9	501.0	503.1	505.1	507.2	509.3	511.4	513.5	515.6	517.7												
92.18	3.20	519.8	521.9	524.0	526.1	528.2	530.3	532.4	534.6	536.7	538.8												
92.28	3.30	541.0	543.1	545.2	547.4	549.6	551.7	553.9	556.0	558.2	560.4												
92.38	3.40	562.6	564.8	567.0	569.1	571.3	573.5	575.8	577.9	580.1	582.3												



SECTION 181

JUBBA RIVER AT JAMAMME

1. RATING TABLE
2. RATING CURVE ( Natural Scale )
3. RATING CURVE ( Log/Log Scale )
4. CROSS SECTIONS.



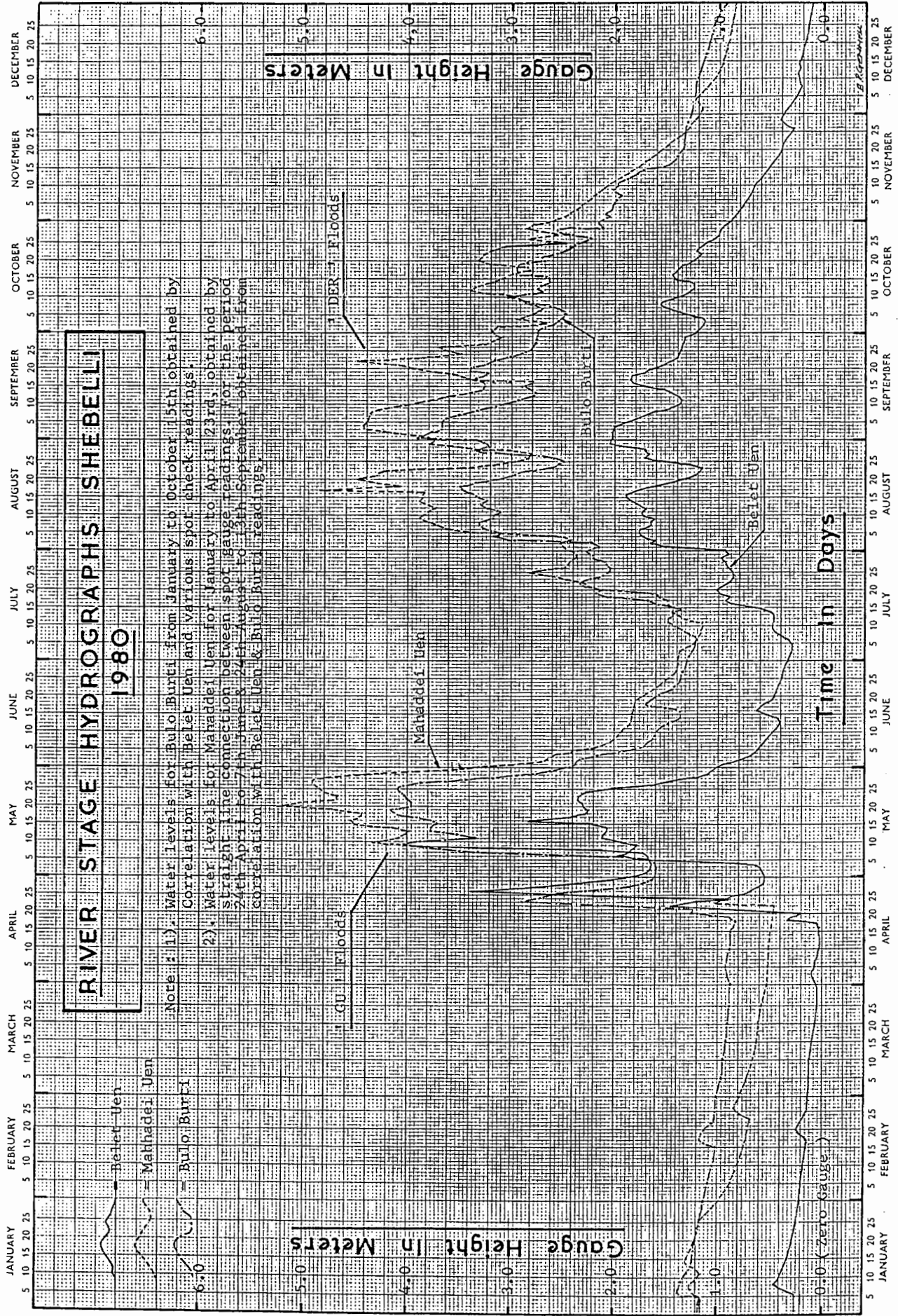
SHEBELLI RIVER

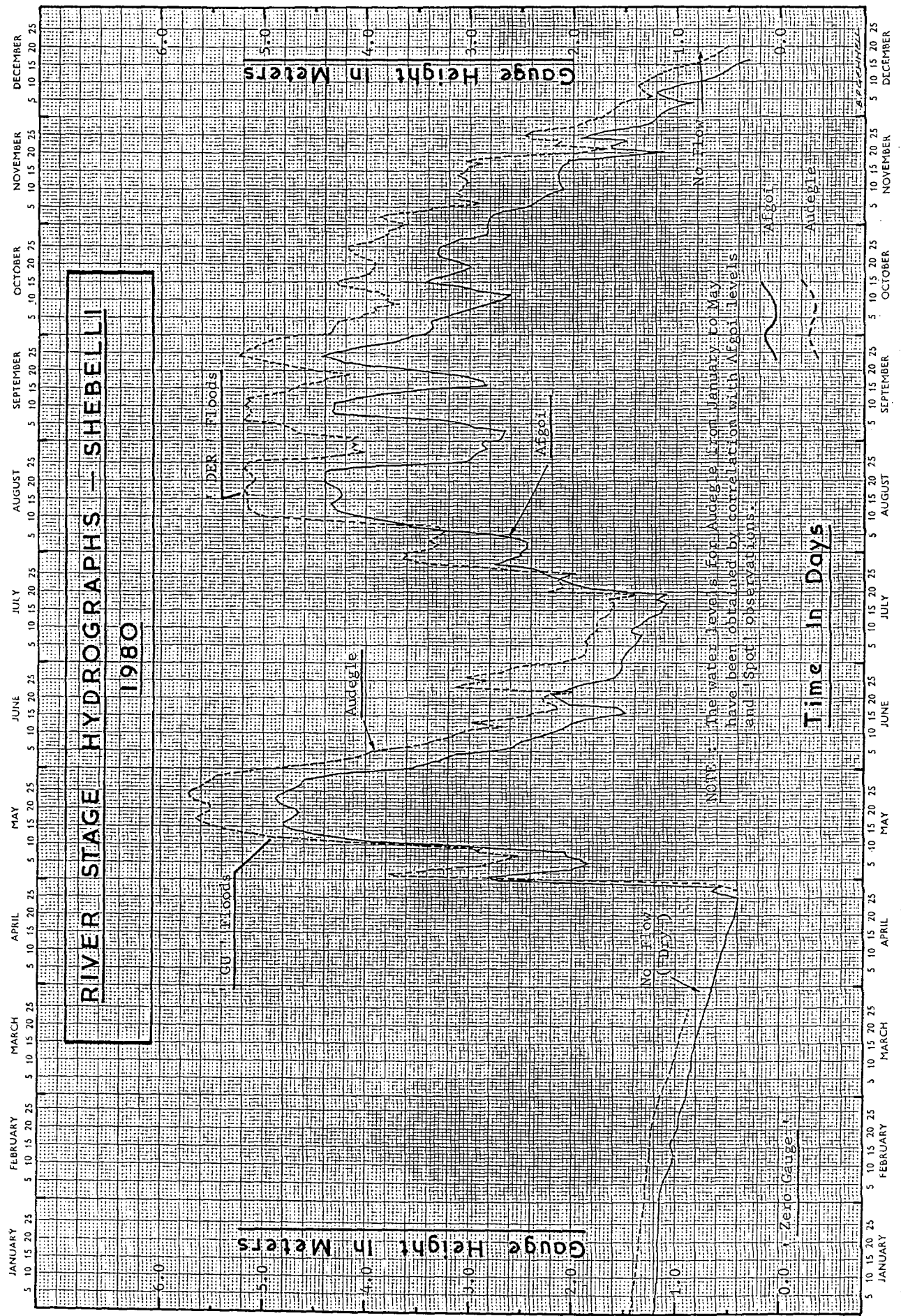
RIVER STAGE HYDROGRAPHS

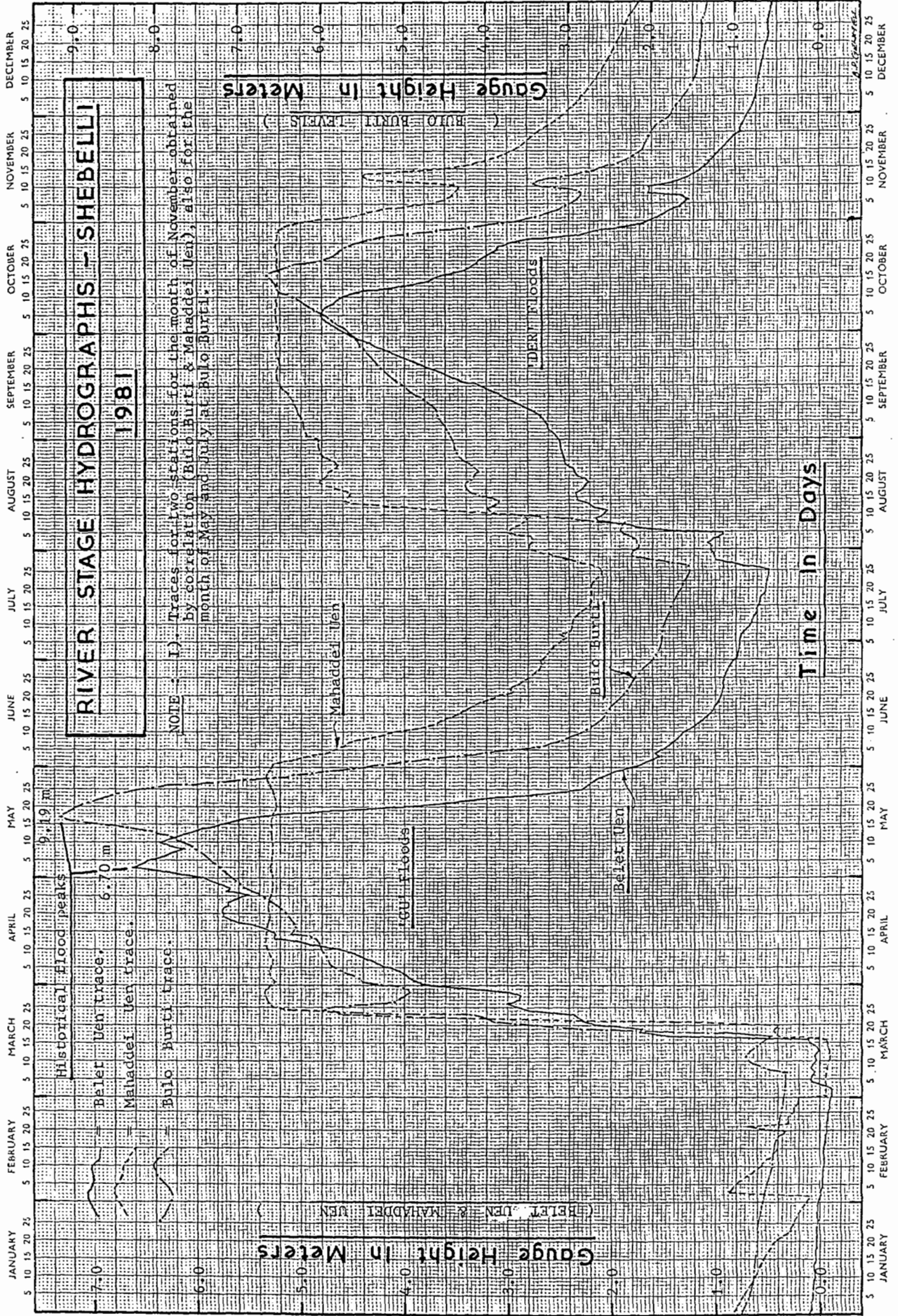
1. SHEBELLI RIVER STAGE HYDROGRAPHS
  - a. Belet Uen, Bulo Burti and Mahaddei Uen ( 1980 )
  - b. Afgoi and Audegle ( 1980 )
  - c. Belet Uen, Bulo Burti and Mahaddei Uen ( 1981 )
  - d. Afgoi and Audegle ( 1981 )

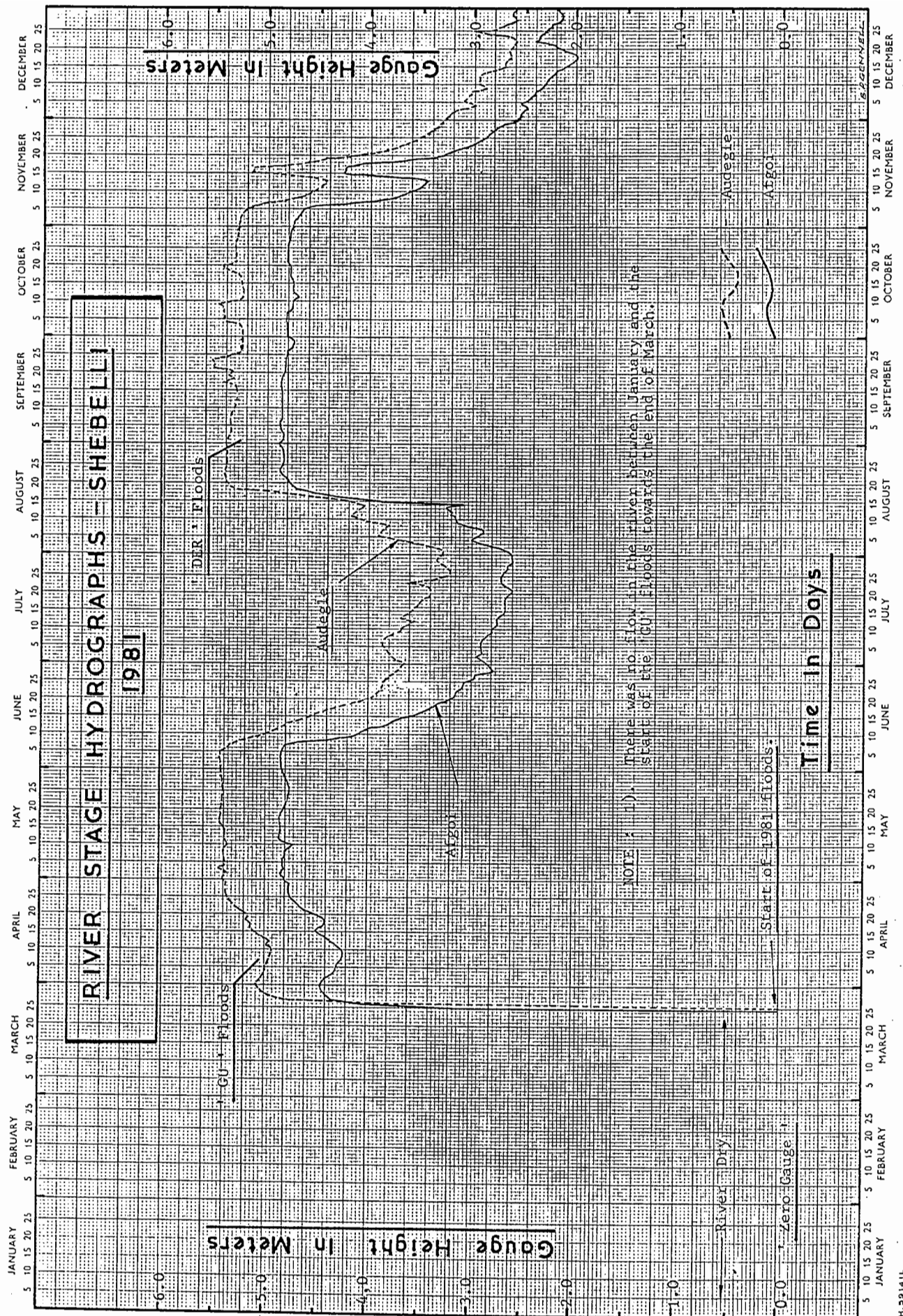








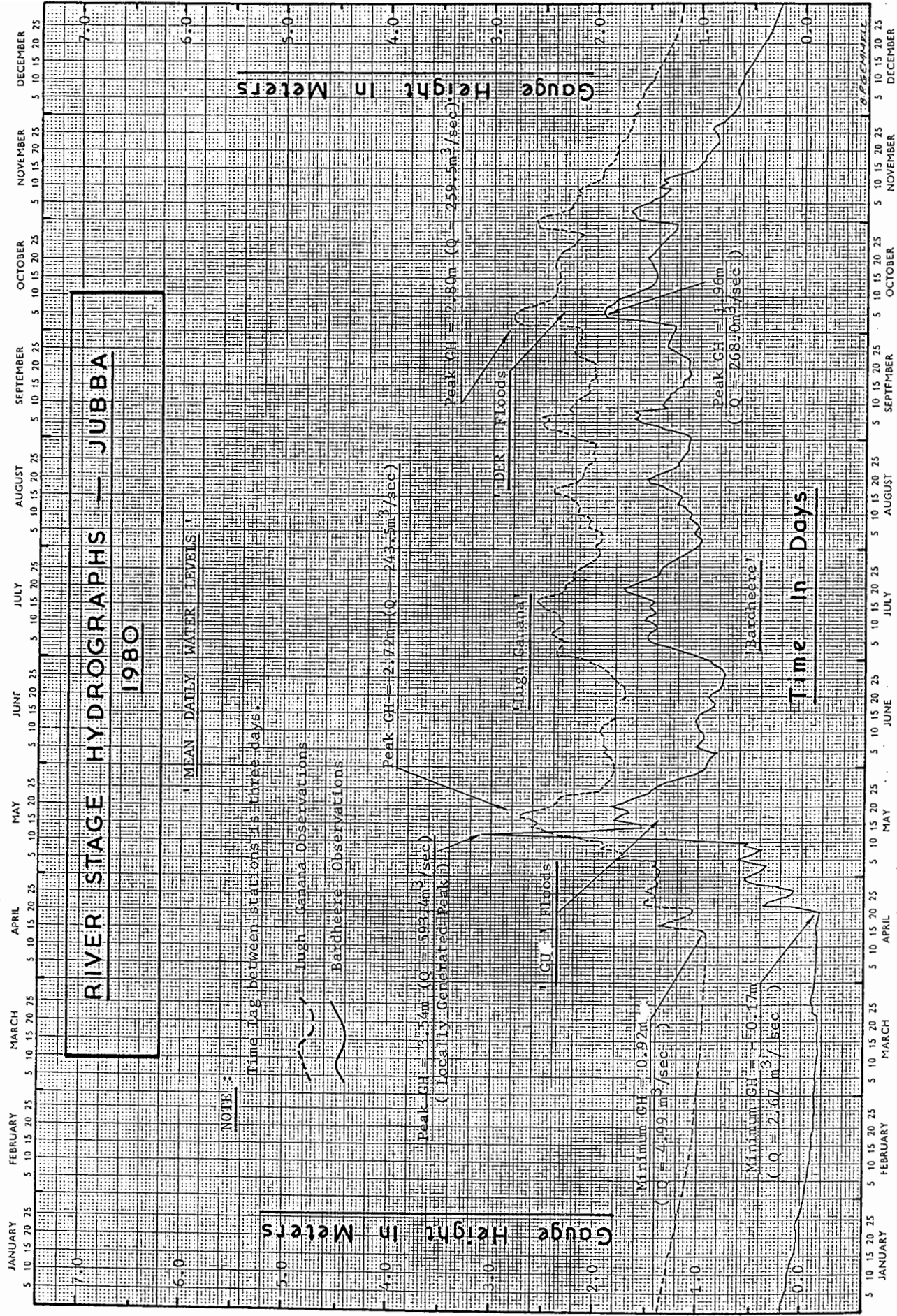


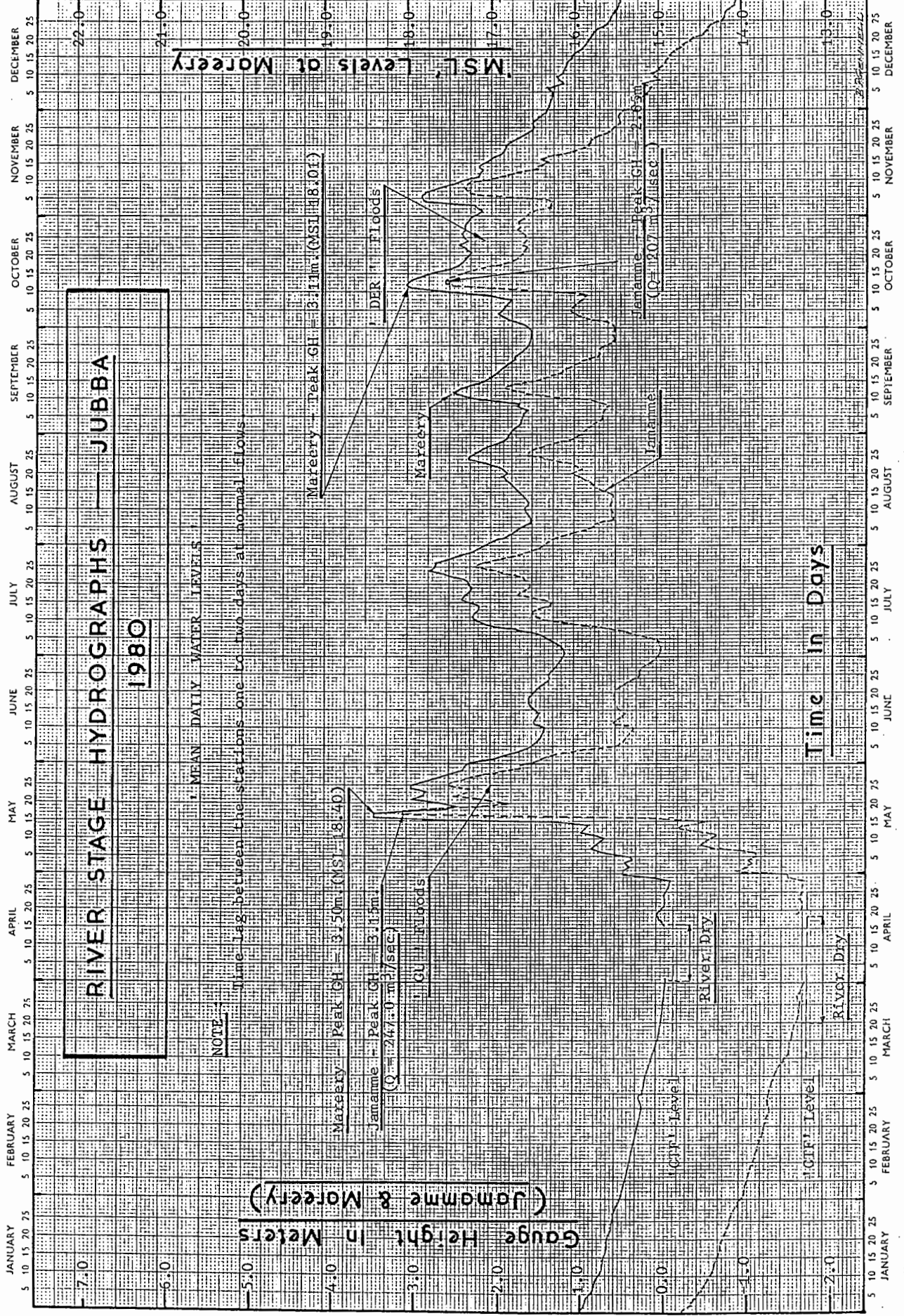


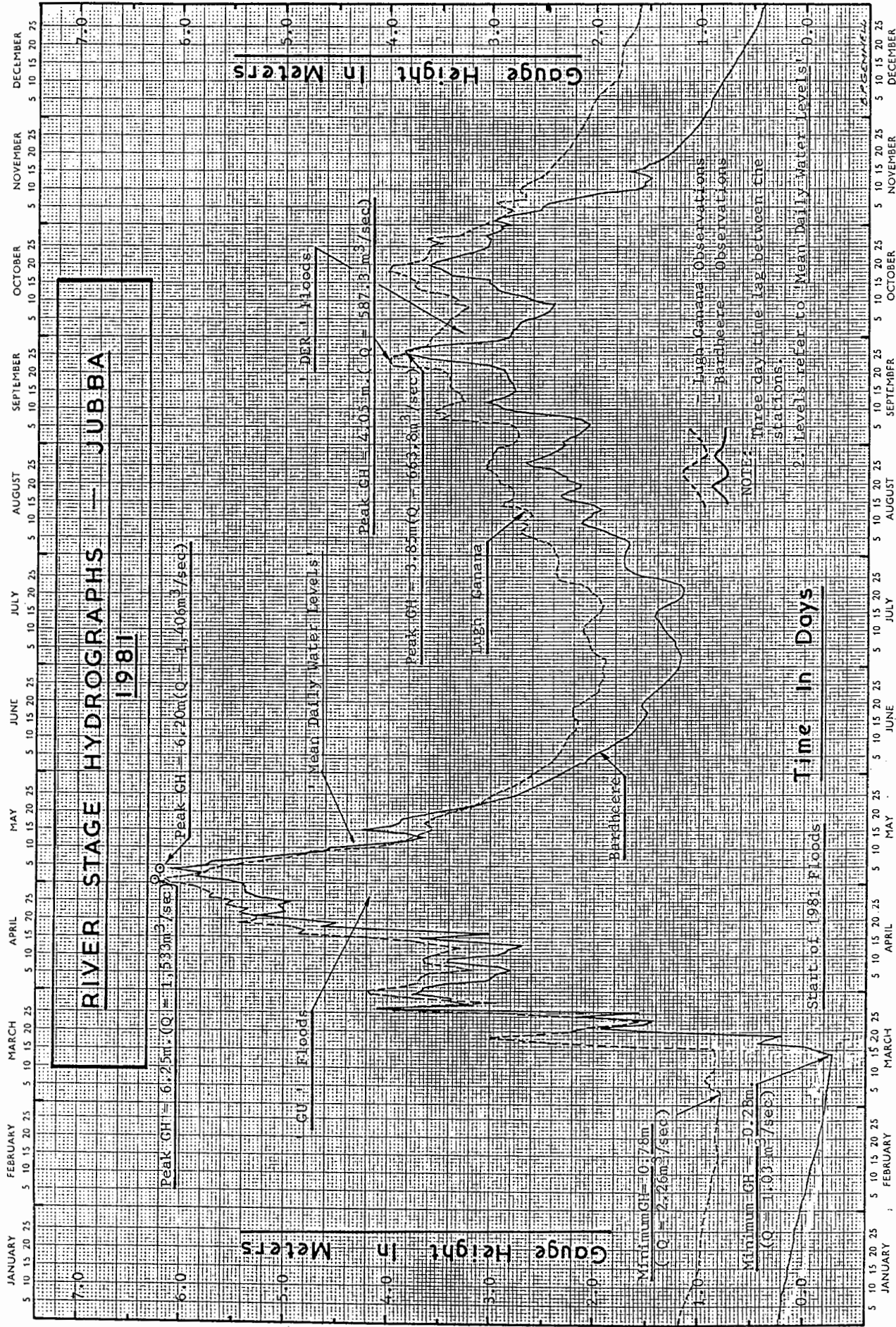
JUBBA RIVER

RIVER STAGE HYDROGRAPHS

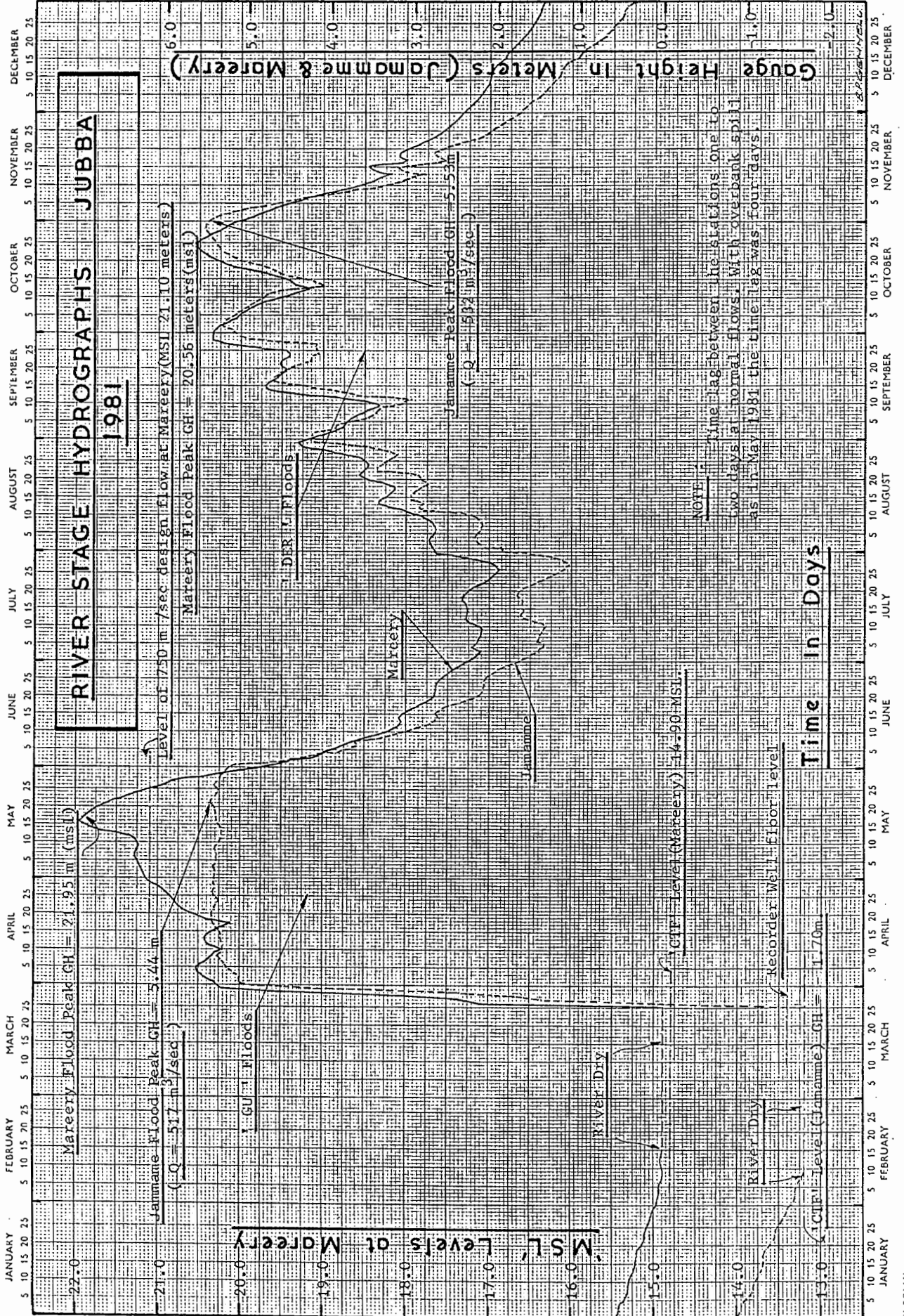
1. JUBBA RIVER STAGE HYDROGRAPHS
  - a. Lugh Ganana and Bardheere ( 1980 )
  - b. Mareery and Jamamme ( 1980 )
  - c. Lugh Ganana and Bardheere ( 1981 )
  - d. Mareery and Jamamme ( 1981 )













SHEBELLI RIVER

STAGE AND DISCHARGE DATA SHEETS

1. Belet Uen, Bulo Burti, Mahaddei Uen, Afgoi and Audegle ( 1980 )
2. " " " " " ( 1981 )
3. Belet Uen recalculated data for the period 1977, 1978 & 1979.
4. Belet Uen discharge data summary sheet ( 1951 - 1981 ).
5. Bulo. Burti discharge data summary sheet ( 1951 - 1981 ).
6. Mahaddei Uen discharge data summary sheet ( 1951 - 1981 ).
7. Afgoi discharge data summary sheet ( 1951 - 1981 ).

# STAGE AND DISCHARGE DATA SHEET

River: SHEBELLI

Year: 1980

Station	Quantity	Units	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<u>BELET UEN</u>	MEAN MONTHLY (GH)	Meters	0.30	0.12	0.09	0.33	1.78	0.52	0.71	1.66	1.61	1.23	0.56	0.20
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec	8.98	4.17	3.51	9.95	96.92	16.90	25.29	87.23	83.19	55.37	18.53	6.11
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.78	0.36	0.30	0.86	8.37	1.46	2.19	7.54	7.19	4.78	1.60	0.53
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	24.18	10.44	9.30	25.79	259.47	43.80	67.89	233.74	215.70	148.18	48.00	16.43
	MONTHLY VOLUME	Percent (%)	2.19	0.95	0.84	2.34	23.53	3.97	6.16	21.19	19.56	13.44	4.35	1.49
	ANNUAL MEANS :	MONTHLY (VOL) :	91.91 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (VOL) :										
			3.01 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (Q) :										
		34.84 M <sup>3</sup> /Sec	ANNUAL DISCHARGE :											
		1.103 M <sup>3</sup> x 10 <sup>6</sup>												
<u>BULO BURTI</u>	MEAN MONTHLY (GH)	Meters	1.23	1.07	0.92	1.24	3.31	1.60	1.73	3.08	3.17	2.61	1.68	1.13
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec	10.94	8.09	2.90	11.12	87.74	19.01	22.41	75.41	80.17	53.23	21.07	9.15
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.95	0.70	0.25	0.96	7.58	1.64	1.94	6.52	6.93	4.60	1.82	0.79
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	29.45	20.30	7.75	28.80	234.98	49.20	60.14	202.12	207.90	142.60	54.60	24.49
	MONTHLY VOLUME	Percent (%)	2.77	1.91	0.73	2.71	22.12	4.63	5.66	19.03	19.57	13.42	5.14	2.31
	ANNUAL MEANS :	MONTHLY (VOL) :	88.53 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (VOL) :										
			2.90 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (Q) :										
		33.56 M <sup>3</sup> /Sec	ANNUAL DISCHARGE :											
		1.062 M <sup>3</sup> x 10 <sup>6</sup>												
<u>MAHADDEI UEN</u>	MEAN MONTHLY (GH)	Meters	1.18	0.81	0.65	0.95	3.77	1.89	1.76	3.56	3.79	3.01	1.86	0.99
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec	9.23	4.48	2.93	6.08	85.78	22.78	19.88	76.84	86.65	55.67	22.10	6.59
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.80	0.39	0.25	0.53	7.41	1.97	1.72	6.64	7.49	4.81	1.91	0.57
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	24.80	11.31	7.85	15.90	229.71	59.10	53.32	205.81	224.60	149.11	57.28	17.65
	MONTHLY VOLUME	Percent (%)	2.35	1.07	0.74	1.49	21.75	5.59	5.05	19.48	21.26	14.12	5.42	1.67
	ANNUAL MEANS :	MONTHLY (VOL) :	88.04 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (VOL) :										
			2.89 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (Q) :										
		33.45 M <sup>3</sup> /Sec	ANNUAL DISCHARGE :											
		1.056 M <sup>3</sup> x 10 <sup>6</sup>												
<u>AFGOI</u>	MEAN MONTHLY (GH)	Meters	1.17	1.02	0.79	-	3.82	2.17	1.66	3.59	3.79	3.10	2.00	-
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec	2.46	1.12	0.07	1.35	62.16	18.41	8.99	55.00	61.21	40.86	15.00	0.01
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.21	0.10	Trace	0.12	5.37	1.59	0.78	4.75	5.29	3.53	1.30	Trace
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	6.51	2.90	0.19	3.60	166.47	47.70	24.18	147.25	158.70	109.43	39.00	0.03
	MONTHLY VOLUME	Percent (%)	0.92	0.41	0.03	0.51	23.58	6.76	3.43	20.86	22.48	15.50	5.52	0.01
	ANNUAL MEANS :	MONTHLY (VOL) :	58.83 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (VOL) :										
			1.93 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (Q) :										
		22.34 M <sup>3</sup> /Sec	ANNUAL DISCHARGE :											
		706 M <sup>3</sup> x 10 <sup>6</sup>												
<u>AUDEGLE</u>	MEAN MONTHLY (GH)	Meters	1.36	1.25	-	-	4.66	2.99	2.13	4.51	4.86	4.01	2.84	-
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec	1.00	0.54	0.01	0.50	67.32	28.25	11.34	65.94	69.14	58.59	24.61	0.20
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.09	0.05	Trace	0.04	5.82	2.44	0.98	5.70	5.97	5.06	2.13	0.02
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	2.79	1.45	0.03	1.20	180.42	73.20	30.38	176.70	179.10	156.86	63.90	0.62
	MONTHLY VOLUME	Percent (%)	0.32	0.17	0.01	0.14	20.81	8.45	3.51	20.39	20.61	18.10	7.37	0.07
	ANNUAL MEANS :	MONTHLY (VOL) :	72.22 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (VOL) :										
			2.37 M <sup>3</sup> x 10 <sup>6</sup>	DAILY (Q) :										
		27.43 M <sup>3</sup> /Sec	ANNUAL DISCHARGE :											
		867 M <sup>3</sup> x 10 <sup>6</sup>												

# STAGE AND DISCHARGE DATA SHEET

River: SHEBELLI

Year: 1981

Station	Quantity	Units	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
BELET UEN * Figures include By-pass canal discharge.	MEAN MONTHLY (GH)	Meters	0.04	0.05	1.30	5.11	4.69	1.15	0.69	2.04	3.40	3.64	1.13	0.54	
	MEAN MONTHLY ( Q )	M <sup>3</sup> /Sec	2.54	0.26	60.10	335.30	304.00	50.13	24.37	120.30	211.30	228.10	48.85	17.71	
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.22	0.02	5.19	28.97	26.27	4.33	2.11	10.39	18.26	19.71	4.22	1.53	
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	6.82	0.56	160.89	909.10*	814.37	129.90	65.41	322.09	554.54*	624.14*	126.60	47.43	
	MONTHLY VOLUME	Percent (%)	0.18	0.01	4.28	24.17	21.65	3.45	1.74	8.56	14.74	16.59	3.37	1.26	
	ANNUAL MEANS :	MONTHLY (VOL) :	M <sup>3</sup> x 10 <sup>6</sup>	313.49											
		MONTHLY (Q) :	M <sup>3</sup> /Sec	119.33											
	ANNUAL DISCHARGE :	M <sup>3</sup> x10 <sup>6</sup>	3,761												
BULO BURTI	MEAN MONTHLY (GH)	Meters	0.78	0.55	2.33	6.29	7.84	2.86	1.82	3.65	5.03	5.85	2.56	1.49	
	MEAN MONTHLY ( Q )	M <sup>3</sup> /Sec	0.89	0.07	41.91	273.30	384.90	64.53	24.93	107.80	193.20	244.20	51.09	16.36	
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.08	0.01	3.62	23.61	33.26	5.58	2.15	9.31	16.69	21.10	4.41	1.41	
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	2.48	0.28	112.22	708.30	1031.06	167.40	66.65	288.61	500.70	654.10	132.30	43.71	
	MONTHLY VOLUME	Percent (%)	0.07	0.01	3.03	19.10	27.81	4.51	1.80	7.78	13.50	17.64	3.57	1.18	
	ANNUAL MEANS :	MONTHLY (VOL) :	M <sup>3</sup> x 10 <sup>6</sup>	308.98											
		MONTHLY (Q) :	M <sup>3</sup> /Sec	117.59											
	ANNUAL DISCHARGE :	M <sup>3</sup> x10 <sup>6</sup>	3,708												
MAHADDEI UEN	MEAN MONTHLY (GH)	Meters	0.49	0.05	-	5.08	5.23	3.62	2.34	4.03	5.08	5.16	3.40	2.03	
	MEAN MONTHLY ( Q )	M <sup>3</sup> /Sec	1.71	0.01	34.09	152.10	160.70	79.34	34.34	97.47	152.10	156.70	70.33	26.14	
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.15	Trace	2.95	13.14	13.88	6.85	2.97	8.42	13.14	13.54	6.08	2.26	
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	4.65	0.02	91.45	394.20	430.28	205.50	92.07	261.02	394.24	419.74	182.40	70.06	
	MONTHLY VOLUME	Percent (%)	0.18	0.01	3.59	15.49	16.90	8.07	3.62	10.25	15.49	16.49	7.16	2.75	
	ANNUAL MEANS :	MONTHLY (VOL) :	M <sup>3</sup> x 10 <sup>6</sup>	212.12											
		MONTHLY (Q) :	M <sup>3</sup> /Sec	80.67											
	ANNUAL DISCHARGE :	M <sup>3</sup> x10 <sup>6</sup>	2,545												
AFGOI	MEAN MONTHLY (GH)	Meters	0.00	0.00	-	4.48	4.81	3.76	2.83	3.70	4.84	4.78	3.84	2.27	
	MEAN MONTHLY ( Q )	M <sup>3</sup> /Sec	0.00	0.00	16.62	84.27	96.21	60.27	33.72	58.39	97.41	95.08	67.79	20.52	
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.00	0.00	1.44	7.28	8.31	5.21	2.91	5.05	8.42	8.22	5.86	1.77	
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.00	0.00	44.64	218.40	257.61	156.30	90.21	156.55	252.60	254.82	175.80	54.87	
	MONTHLY VOLUME	Percent (%)	0.00	0.00	2.69	13.14	15.50	9.41	5.43	9.42	15.20	15.34	10.58	3.30	
	ANNUAL MEANS :	MONTHLY (VOL) :	M <sup>3</sup> x 10 <sup>6</sup>	138.46											
		MONTHLY (Q) :	M <sup>3</sup> /Sec	52.66											
	ANNUAL DISCHARGE :	M <sup>3</sup> x10 <sup>6</sup>	1,662												
AUDEGLE	MEAN MONTHLY (GH)	Meters	0.00	0.00	-	5.14	5.41	4.52	3.55	4.73	5.34	5.32	4.43	2.87	
	MEAN MONTHLY ( Q )	M <sup>3</sup> /Sec	0.00	0.00	15.56	80.63	95.72	66.03	44.88	67.87	94.14	93.69	65.19	25.32	
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.00	0.00	1.34	6.97	8.27	5.70	3.88	5.86	8.13	8.09	5.63	2.19	
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	0.00	0.00	41.54	209.00	256.37	171.00	120.28	181.66	243.90	250.79	168.90	67.89	
	MONTHLY VOLUME	Percent (%)	0.00	0.00	2.43	12.21	14.98	9.99	7.03	10.62	14.25	14.65	9.87	3.97	
	ANNUAL MEANS :	MONTHLY (VOL) :	M <sup>3</sup> x 10 <sup>6</sup>	142.61											
		MONTHLY (Q) :	M <sup>3</sup> /Sec	54.28											
	ANNUAL DISCHARGE :	M <sup>3</sup> x10 <sup>6</sup>	1,711												

# STAGE AND DISCHARGE DATA SHEET

River: S H E B E L L I

Year: 1977 / 1979

Station	Quantity	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
<u>BELET UEN</u> 1977 (1980/81 RATING CURVE)	MEAN MONTHLY (GH)	0.41	0.41	0.48	1.86	3.14	1.31	1.56	2.21	2.59	2.82	4.19	2.13	
	MEAN MONTHLY ( Q )	12.68	12.68	15.30	104.10	193.40	60.82	79.28	135.70	156.20	171.50	267.50	128.80	
	MEAN DAILY VOLUME	1.10	1.10	1.32	8.99	16.71	5.25	6.85	11.72	13.50	14.82	23.11	11.13	
	MONTHLY VOLUME	34.10	30.80	40.92	269.70	518.01	157.50	212.35	363.32	405.00	459.42	693.30	345.03	
	MONTHLY VOLUME	0.97	0.86	1.16	7.64	14.67	4.46	6.02	10.29	11.47	13.01	19.64	9.77	
	ANNUAL MEANS :	MONTHLY(VOL) : 294.12		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(VOL) : 9.67		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(Q) : 111.94		M <sup>3</sup> /Sec		ANNUAL DISCHARGE: 3,530
	MEAN MONTHLY (GH)	0.69	0.41	1.62	1.15	1.71	0.80	1.29	2.57	3.12	2.90	2.03	0.80	
	MEAN MONTHLY ( Q )	24.37	12.68	84.00	50.13	91.27	29.80	59.02	154.80	192.00	177.00	119.40	29.80	
	MEAN DAILY VOLUME	2.11	1.10	7.26	4.33	7.89	2.57	5.10	13.37	16.59	15.29	10.32	2.57	
	MONTHLY VOLUME	65.41	30.80	225.06	129.90	244.59	77.10	158.10	414.47	497.70	473.99	309.60	79.67	
MONTHLY VOLUME	2.42	1.14	8.32	4.80	9.04	2.85	5.84	15.32	18.39	17.52	11.44	2.94		
ANNUAL MEANS :	MONTHLY(VOL) : 225.50		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(VOL) : 7.41		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(Q) : 85.81		M <sup>3</sup> /Sec		ANNUAL DISCHARGE: 2,706	
<u>BELET UEN</u> 1979	MEAN MONTHLY (GH)	0.60	1.35	1.13	1.51	1.62	1.94	1.31	1.96	1.43	1.59	1.20	0.41	
	MEAN MONTHLY ( Q )	20.26	63.65	48.85	75.41	84.00	111.10	60.82	112.90	69.43	81.61	53.34	12.68	
	MEAN DAILY VOLUME	1.75	5.50	4.22	6.52	7.26	9.60	5.25	9.75	6.00	7.05	4.61	1.10	
	MONTHLY VOLUME	54.25	154.00	130.82	195.60	225.06	288.00	162.75	302.25	180.00	218.55	138.30	34.10	
	MONTHLY VOLUME	2.60	7.39	6.28	9.39	10.80	13.82	7.81	14.50	8.64	10.49	6.64	1.64	
	ANNUAL MEANS :	MONTHLY(VOL) : 173.67		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(VOL) : 5.71		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(Q) : 66.08		M <sup>3</sup> /Sec		ANNUAL DISCHARGE: 2,084
	MEAN MONTHLY (GH)													
	MEAN MONTHLY ( Q )													
	MEAN DAILY VOLUME													
	MONTHLY VOLUME													
MONTHLY VOLUME														
ANNUAL MEANS :	MONTHLY(VOL) :		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(VOL) :		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(Q) :		M <sup>3</sup> /Sec		ANNUAL DISCHARGE: M <sup>3</sup> x10 <sup>6</sup>	
MEAN MONTHLY (GH)														
MEAN MONTHLY ( Q )														
MEAN DAILY VOLUME														
MONTHLY VOLUME														
MONTHLY VOLUME														
ANNUAL MEANS :	MONTHLY(VOL) :		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(VOL) :		M <sup>3</sup> x 10 <sup>6</sup>		DAILY(Q) :		M <sup>3</sup> /Sec		ANNUAL DISCHARGE: M <sup>3</sup> x10 <sup>6</sup>	

S H E B E L L I R I V E R

PERIOD: 1951/1981

( Streamflow in m<sup>3</sup>/sec )

STATION : Belet Uen

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	Annual 'Q' (m <sup>3</sup> × 10 <sup>6</sup> )	Max 'Q' (m <sup>3</sup> /sec)	MIN 'Q' (m <sup>3</sup> /sec)
1951	(16.00)	(13.00)	(37.36)	171.00	229.00	193.00	24.60	62.00	81.30	72.30	191.00	92.70	(98.61)	(3,110)	300	-
1952	8.20	4.97	4.65	5.02	87.50	39.70	7.48	38.80	125.30	84.30	42.10	4.12	37.90 *	1,198	160	-
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954	8.58	11.20	8.60	88.80	59.00	25.50	6.73	102.30	153.50	209.50	7.73	34.70	65.80	2,075	250	-
1955	7.84	7.45	8.97	9.65	44.00	12.73	7.47	29.80	97.50	135.80	42.50	8.60	34.50	1,088	255	-
1956	7.84	7.45	9.35	33.20	147.00	29.30	25.30	99.00	151.20	145.00	218.00	29.40	83.80 *	2,650	320	-
1957	11.20	8.28	20.10	59.80	200.00	106.30	51.90	124.20	130.00	52.60	56.30	42.20	72.40	2,283	270	-
1958	9.70	18.20	44.80	20.40	63.10	10.80	13.80	117.20	161.20	169.50	81.00	16.70	61.00	1,924	205	-
1959	8.97	8.28	7.48	7.34	73.70	21.98	11.92	76.90	143.00	122.80	112.00	22.40	51.60	1,627	194	-
1960	67.00	25.20	8.97	19.65	65.70	38.60	16.40	41.10	88.00	(127.26)	(89.57)	(44.35)	(52.65)*	1,665	-	-
1961	10.42	10.30	7.83	9.28	52.60	15.00	46.30	122.90	235.00	214.00	215.00	260.00	100.40	3,166	381	-
1962	15.30	7.86	7.10	13.50	59.10	17.40	8.60	31.00	75.70	88.70	157.00	75.20	46.50	1,466	245	-
1963	22.65	19.00	8.23	60.70	301.00	139.00	62.00	108.00	158.00	99.30	54.80	79.50	93.50	2,949	243	-
1964	39.20	14.80	6.72	23.20	32.40	16.20	23.10	122.60	158.60	156.00	97.20	29.50	60.40 *	1,910	225	-
1965	53.40	14.05	5.60	8.12	46.00	10.80	3.73	31.00	70.70	85.00	94.30	(8.97)	43.00	1,356	180	-
1966	1.12	5.38	24.90	35.50	89.20	38.60	38.00	74.00	126.00	101.00	60.50	8.97	50.70	1,599	195	-
1967	1.87	2.07	1.49	47.10	124.63	54.05	31.72	113.43	182.24	220.90	147.88	183.95	92.61	2,921	289	-
1968	25.37	12.80	66.42	95.37	278.36	135.90	87.69	127.99	143.24	117.16	60.23	60.07	100.88 *	3,190	341	-
1969	20.16	24.28	116.70	106.60	131.90	45.85	61.90	128.00	174.00	82.60	40.90	14.00	78.90	2,488	204	-
1970	7.51	20.72	65.70	103.19	162.02	27.80	25.29	124.12	218.06	172.30	95.76	15.59	86.50	2,728	233	-
1971	8.65	5.70	4.50	50.18	90.50	45.58	80.80	103.80	151.98	104.65	74.80	32.20	62.79	1,980	173	-
1972	10.10	22.87	15.00	53.59	173.60	67.13	83.10	117.90	144.40	111.40	71.60	17.90	74.00 *	2,340	232	-
1973	17.90	4.50	3.00	6.70	58.10	24.10	27.70	90.10	127.20	100.40	25.90	4.60	39.40	1,243	159	-
1974	(0)	(2)	(0)	69.70	62.10	70.20	75.30	106.10	131.70	78.50	19.00	5.50	(51.70)	(1,630)	167	-
1975	-	-	-	-	79.00	43.30	64.70	127.00	208.70	126.00	33.70	8.00	-	-	221	-
1976	-	-	-	-	83.00	52.60	38.00	-	-	-	-	-	-	-	336	-
1977	12.68	12.68	15.30	104.10	193.40	60.80	29.28	135.70	156.20	171.50	262.50	120.80	111.94	3,530	327	7.79
1978	24.32	12.68	84.00	50.13	41.27	29.80	59.02	154.80	192.00	122.00	119.40	29.80	85.36	2,580	261	10.27
1979	20.26	63.65	48.85	75.41	84.00	111.10	60.82	112.90	69.43	81.61	53.34	12.68	66.17	2,084	157	7.21
1980	8.96	4.17	3.51	9.95	96.92	16.90	25.29	87.23	83.19	55.37	18.53	6.11	34.84 *	1,103	172	2.01
1981	2.54	0.26	60.10	335.30	304.00	50.13	24.37	120.30	211.30	228.10	48.85	17.71	119.33	3,761	1,394	0.49
MEAN	16.00	13.00	37.36	59.73	122.07	51.67	39.08	97.59	143.06	127.26	89.57	44.35	70.06	2,209	282	-

DATA SOURCE: A). Irrigation Report by J.C. Henry-1979. B). Ministry of Agriculture records 1951 - 79. C). B.P. Gemell 1980 - 81 ( Water Hyrometry Project. Data for period 1977 - 1981 computed from 1980/81 rating curve. The bracketed figures 1951 & 1960 are mean values due to missing data. Asterisk denotes leap year.

S H E B E L L I R I V E R

PERIOD : 1951/81

( Streamflow in m<sup>3</sup>/sec )

STATION : Bullo Burti

YEAR	Jan 1	Feb 2	Mar 3	Apr 4	May 5	Jun 6	Jul 7	Aug 8	Sep 9	Oct 10	Nov 11	Dec 12	Annual Mean	Annual ' Q ' ( m <sup>3</sup> x 10 <sup>6</sup> )
1951	-	-	-	151.74	176.12	162.93	17.54	55.60	76.06	60.07	163.32	87.69	105.67	3,332
1952	10.82	9.20	9.33	9.65	83.58	20.08	10.07	22.76	117.76	81.34	36.68	9.70	35.08 *	1,109
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954	10.45	10.33	10.45	81.47	44.78	22.00	8.21	68.28	137.45	170.00	75.29	29.10	55.65	1,755
1955	9.70	9.09	9.70	9.65	32.84	11.58	8.96	21.64	94.59	125.37	36.68	9.70	31.63	997
1956	9.70	9.20	10.45	29.34	186.57	22.78	24.63	91.42	137.06	128.36	181.08	22.39	71.08 *	2,248
1957	11.19	9.50	19.03	53.28	151.87	100.77	44.40	114.43	117.37	46.64	51.35	37.31	63.14	1,991
1958	10.07	15.29	39.55	20.08	57.46	10.81	12.31	110.45	141.70	151.49	73.36	13.80	54.70	1,725
1959	9.70	9.92	9.70	9.65	69.40	17.76	11.19	72.76	131.27	114.93	101.54	16.79	47.88	1,510
1960	59.70	19.60	10.45	14.29	60.07	33.20	13.43	30.97	82.24	-	-	-	35.99 *	1,138
1961	10.82	10.74	9.33	10.04	49.25	11.97	32.09	114.93	171.81	163.43	180.30	222.00	82.23	2,593
1962	20.15	7.44	9.33	12.36	54.10	16.99	9.70	25.75	73.36	83.21	150.97	81.34	45.39	1,431
1963	21.64	9.09	3.36	59.85	216.04	140.54	60.07	98.51	142.47	95.90	56.37	82.84	82.22	2,593
1964	32.84	12.00	4.10	20.08	27.61	11.58	32.09	120.52	171.81	172.00	102.32	16.04	60.25 *	1,905
1965	51.49	6.20	2.61	4.25	49.25	5.02	2.24	21.27	79.15	100.37	121.24	(30.22)	39.44	1,244
1966	11.94	2.07	3.73	30.89	94.40	34.75	33.21	67.91	133.98	107.46	102.70	23.13	53.85	1,698
1967	5.60	1.65	1.12	39.77	132.84	68.73	35.45	129.85	196.14	220.52	163.71	185.45	98.40	3,103
1968	28.36	11.60	85.82	96.53	231.34	163.32	95.52	135.45	154.83	131.34	63.71	62.69	105.04 *	3,322
1969	14.30	13.80	126.40	-	-	41.90	75.30	135.80	193.70	103.90	49.50	5.70	76.03	2,398
1970	3.00	11.20	58.30	120.27	169.67	23.62	14.32	126.93	208.49	169.13	104.41	11.48	85.06	2,682
1971	3.85	1.69	2.74	47.11	107.40	59.78	95.95	121.47	163.48	120.11	83.80	30.79	69.84	2,202
1972	4.70	18.08	8.82	63.10	112.10	42.80	38.80	13.10	164.10	181.60	82.90	12.00	62.19 *	1,967
1973	4.10	1.70	1.30	13.00	50.90	20.70	16.70	102.20	15.30	29.20	21.80	17.20	27.60	870
1974	( 0 )	1.40	-	76.00	57.90	-	-	-	117.20	-	-	-	-	-
1975	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1976	-	-	-	-	-	172.40	75.10	132.50	174.30	151.60	136.40	58.40	-	-
1977	-	-	-	-	215.10	103.80	-	-	-	199.30	242.30	187.20	-	-
1978	62.00	-	-	-	-	-	133.80	210.40	26.16	-	-	-	-	-
1979	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1980	10.94	8.09	2.90	11.12	87.74	19.01	22.41	75.41	80.17	53.23	21.07	9.15	33.44 *	1,057
1981	0.89	0.07	41.91	273.30	384.90	64.53	24.93	107.80	193.20	244.20	51.09	16.36	116.93	3,688
MEAN	17.22	8.32	21.49	51.54	112.10	49.99	36.39	89.58	138.18	128.26	97.88	51.02	67.18	2,119

DATA SOURCE : Selchozpromexport(1965 & 73), M.MacDonalds & Partners, Ministry of Agriculture records, and B.P.Gemmill/FAO (1980/81)

\* Asterisk denotes a leap year.



S H E B E L L I R I V E R  
( Streamflow in m<sup>3</sup> / sec )

STATION : Mahaddei Uen

PERIOD : 1951/81

YEAR	Jan 1	Feb 2	Mar 3	Apr 4	May 5	Jun 6	Jul 7	Aug 8	Sep 9	Oct 10	Nov 11	Dec 12	Annual Mean	Annual ' Q ' ( m <sup>3</sup> x 10 <sup>6</sup> )
1951	-	-	-	121.62	129.10	106.56	22.01	54.85	78.38	45.90	129.73	91.79	(86.66)	2,733
1952	10.82	5.20	5.22	5.02	77.61	22.39	10.07	23.88	88.80	78.73	42.08	4.48	31.19 *	986
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954	11.19	11.57	11.19	72.59	60.07	26.64	4.10	71.27	128.96	129.48	69.11	33.58	52.48	1,655
1955	5.97	2.89	7.46	8.49	38.43	13.51	2.61	20.15	93.44	126.12	39.77	6.72	30.46	961
1956	5.60	3.60	9.70	18.92	118.66	28.57	24.63	91.04	127.41	118.28	120.46	30.22	58.09 *	1,837
1957	13.43	6.61	15.30	54.05	127.99	102.32	46.64	105.60	120.08	48.88	51.74	39.18	60.99	1,923
1958	9.33	16.53	41.79	22.39	63.43	11.58	14.18	100.75	129.73	129.48	69.11	19.78	52.34	1,651
1959	9.70	7.44	5.60	5.41	73.88	23.55	14.18	69.03	115.83	116.04	103.09	23.12	47.24	1,490
1960	61.94	24.00	11.19	20.85	59.33	37.07	18.28	36.94	79.54	-	-	-	(38.79)*	1,227
1961	11.19	11.98	5.22	8.49	50.00	16.99	41.04	113.81	129.34	128.73	129.73	129.48	64.67	2,039
1962	15.67	3.72	3.73	11.58	49.25	15.44	8.58	26.49	67.95	80.60	125.87	69.40	39.86	1,257
1963	6.34	3.72	2.99	50.58	127.99	93.05	51.49	97.01	130.50	92.91	47.10	80.60	65.36	2,061
1964	36.94	17.60	7.46	24.71	35.45	22.39	30.22	89.18	124.63	131.27	88.80	26.49	52.93 *	1,674
1965	54.85	16.94	7.46	5.79	47.01	14.67	4.85	20.52	64.09	81.72	108.11	46.27	39.36	1,241
1966	11.94	4.13	27.61	35.14	85.07	44.79	40.30	61.57	108.49	96.27	77.99	18.28	50.97	1,607
1967	4.10	0.83	0.37	37.45	100.75	75.29	29.48	95.52	135.52	131.34	130.50	123.51	72.06	2,273
1968	38.43	19.20	71.27	78.76	138.80	120.46	82.84	104.85	128.57	116.00	69.88	70.15	86.60 *	2,738
1969	28.45	23.88	99.80	64.48	112.68	62.43	53.00	108.87	134.07	99.77	52.45	17.68	71.46	2,254
1970	9.67	22.76	42.94	103.20	137.12	43.32	20.13	96.30	139.93	138.87	101.92	27.27	73.62	2,322
1971	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1972	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1973	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1974	( 0 )	-	-	-	-	-	-	-	-	-	-	-	-	-
1975	45.50	-	-	-	60.10	-	-	-	-	-	-	-	-	-
1976	-	-	-	-	126.00	-	-	-	-	-	-	-	-	-
1977	12.10	11.90	13.20	79.20	139.10	84.20	69.20	103.30	118.10	135.50	144.60	130.40	86.73	2,735
1978	-	21.00	-	68.80	92.90	-	33.80	17.00	42.70	106.00	89.30	39.30	-	-
1979	56.90	69.90	75.80	45.20	65.30	105.00	62.60	102.00	-	-	-	-	-	-
1980	9.23	4.48	2.93	6.08	85.80	22.80	19.90	96.80	86.70	55.70	22.10	6.60	33.18 *	1,103
1981	1.71	0.01	34.10	152.10	160.70	79.30	34.30	97.50	152.10	156.70	70.30	26.10	80.41	2,545
MEAN	19.60	13.50	22.90	45.82	90.90	51.83	34.76	76.95	112.40	105.38	82.87	48.08	58.75	1,853

DATA SOURCE : Selchozpromexport( 1965 & 73), M. MacDonalds & Partners, Ministry of Agriculture records, and B.P.Gemmell/FAO (1980/81).

\* Asterisks denotes a leap year.

S H E B E L L I R I V E R

( Streamflow in m<sup>3</sup>/sec )

PERIOD : 1951/81

STATION : AFGOI

YEAR	Jan 1	Feb 2	Mar 3	Apr 4	May 5	Jun 6	Jul 7	Aug 8	Sep 9	Oct 10	Nov 11	Dec 12	Annual Mean	Annual 'Q' ( m <sup>3</sup> x 10 <sup>6</sup> )
1951	(14.80)	( 8.50)	(12.90)	91.12	92.91	81.08	17.91	49.25	75.59	42.54	93.05	75.00	(54.55)	1,720
1952	5.22	1.20	1.12	1.16	70.15	20.08	3.73	17.91	84.56	70.90	37.45	1.49	26.25 *	830
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954	4.85	4.96	5.22	73.36	53.73	21.24	1.12	55.22	93.05	89.93	60.23	28.73	40.97	1,296
1955	1.87	0.83	2.24	2.70	38.81	8.11	1.12	16.42	80.31	92.91	34.75	2.61	23.56	745
1956	1.49	1.20	4.10	6.18	88.43	23.17	19.03	81.34	93.05	88.81	89.58	25.75	43.51 *	1,376
1957	6.72	1.65	1.12	47.10	91.79	87.64	42.16	84.33	92.66	44.40	48.65	32.46	48.39	1,530
1958	3.36	11.16	47.39	11.58	56.72	5.02	7.84	82.09	93.05	92.91	61.00	13.43	40.46	1,279
1959	3.36	2.07	1.12	1.16	61.57	16.60	7.84	65.30	87.64	91.42	81.08	16.79	36.33	1,149
1960	57.09	18.00	4.85	14.29	55.97	33.98	11.94	32.46	75.29	-	-	-	- *	-
1961	5.22	5.37	1.87	3.47	32.09	15.06	35.82	89.55	93.05	92.91	96.14	92.91	47.97	1,517
1962	10.07	1.24	1.12	7.34	46.27	12.36	4.10	21.64	65.25	74.63	92.66	64.18	33.41	1,057
1963	2.99	0.83	1.12	39.77	92.16	76.45	47.76	81.34	94.21	83.96	45.95	77.99	53.71	1,698
1964	38.06	14.80	3.36	15.08	32.84	16.60	23.13	33.58	91.89	91.04	80.31	66.42	42.26 *	1,336
1965	46.64	14.46	2.61	2.70	45.52	9.27	1.49	2.24	55.98	63.43	84.56	48.88	31.48	995
1966	8.21	0.83	22.76	23.94	68.66	36.29	32.09	48.88	80.31	74.25	63.32	13.81	39.45	1,248
1967	1.49	1.24	( 0 )	26.64	77.61	69.88	27.61	81.34	96.14	92.91	91.51	89.93	54.69	1,729
1968	29.48	9.20	52.99	56.76	91.79	86.49	70.90	83.96	91.51	88.81	62.16	64.18	65.69 *	2,077
1969	24.60	18.60	72.90	94.90	89.04	63.00	46.40	83.50	95.10	85.08	52.07	16.60	61.82	1,955
1970	4.75	15.04	31.50	87.20	96.90	49.90	18.80	79.40	97.80	97.00	86.20	25.90	57.53	1,819
1971	10.31	2.33	( 0 )	23.39	74.89	52.35	70.88	87.70	97.81	88.18	69.00	45.11	51.81	1,638
1972	9.65	5.12	19.58	17.64	92.60	74.70	60.60	97.70	102.10	96.10	82.10	30.40	57.40 *	1,815
1973	( 0 )	( 0 )	( 0 )	( 0 )	-	36.40	-	-	-	83.80	45.70	16.70	-	-
1974	( 0 )	( 0 )	( 0 )	( 0 )	59.60	57.60	82.00	82.00	90.70	73.50	29.10	(17.90)	(41.03)	1,294
1975	-	-	-	-	59.40	46.80	37.40	92.50	96.70	85.20	29.50	5.10	-	-
1976	-	-	-	-	86.20	90.90	62.10	90.40	98.40	73.40	63.70	40.10	- *	-
1977	12.30	11.60	7.73	54.10	101.20	66.20	55.40	-	93.90	94.80	98.70	-	-	-
1978	56.20	9.80	(13.40)	53.50	74.60	44.10	37.00	93.30	42.20	112.10	94.20	44.00	56.20	1,777
1979	22.80	58.90	29.22	81.11	70.91	110.00	52.90	64.80	65.05	54.40	37.10	9.95	54.80	1,733
1980	2.50	1.10	0.07	1.40	62.20	18.40	9.00	55.00	61.20	40.90	15.00	0.01	22.20 *	702
1981	( 0 )	( 0 )	16.60	84.30	96.20	60.30	33.70	58.40	97.40	95.10	67.80	20.50	52.50	1,656
MEAN	13.83	7.93	13.00	33.30	71.00	43.60	31.80	64.70	85.40	81.30	65.10	35.90	45.60	1,438

DATA SOURCE : ScIchozpromexport (1965 & 73 ), M. Macdonalds & Partners, Ministry of Agriculture records, and B.P.Gemnell/FAO ( 1980/81).

\* Asterisk denotes leap year.

JUBBA RIVER

STAGE AND DISCHARGE DATA SHEETS

- 1.. Lugh Ganana . . . . . ( 1977/79 )
2. Lugh Ganana, Bardheere and Jamamme . ( 1980 )
3. Lugh Ganana, Bardheere and Jamamme . ( 1981 )
4. Lugh Ganana discharge data summary sheet( 1951 / 1981 ).



# STAGE AND DISCHARGE DATA SHEET

River: JUBBA

Year: 1980

Station	Quantity	Units	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
LUGH GANANA	MEAN MONTHLY (GH)	Meters	1.25	1.06	0.96	1.11	2.06	1.86	2.30	2.11	2.19	2.44	1.97	1.37		
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec	21.81	9.89	6.16	12.21	107.80	79.03	149.40	115.50	129.00	178.80	94.61	31.26		
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	1.88	0.85	0.53	1.06	9.31	6.83	12.91	9.96	11.15	15.45	8.17	2.70		
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	58.28	24.65	16.43	31.80	288.61	204.90	400.21	308.76	334.50	478.95	245.10	83.70		
	MONTHLY VOLUME	Percent (%)	2.35	1.00	0.66	1.28	11.66	8.28	16.16	12.47	13.51	19.34	9.90	3.38		
	ANNUAL MEANS :	MONTHLY(VOL):	206.32	M <sup>3</sup> x 10 <sup>6</sup>	DAILY(VOL):	6.76	M <sup>3</sup> x 10 <sup>6</sup>	DAILY(Q):	78.24	M <sup>3</sup> /Sec	ANNUAL DISCHARGE: 2,476					M <sup>3</sup> x10 <sup>6</sup>
	MEAN MONTHLY (GH)	Meters	0.06	- 0.10	- 0.15	0.05	1.22	0.90	1.40	1.18	1.28	1.52	1.14	0.48		
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec	12.00	4.38	3.09	11.20	126.90	80.00	159.80	120.20	137.30	184.80	113.80	38.20		
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	1.04	0.38	0.27	0.97	10.96	6.91	13.81	10.39	11.86	15.97	9.83	3.30		
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	32.24	11.02	8.37	29.10	339.76	207.30	428.11	322.09	355.80	495.07	294.90	102.30		
MONTHLY VOLUME	Percent (%)	1.23	0.42	0.32	1.11	12.94	7.89	16.30	12.27	13.55	18.85	11.23	3.90			
ANNUAL MEANS :	MONTHLY(VOL):	218.84	M <sup>3</sup> x 10 <sup>6</sup>	DAILY(VOL):	7.18	M <sup>3</sup> x 10 <sup>6</sup>	DAILY(Q):	83.10	M <sup>3</sup> /Sec	ANNUAL DISCHARGE: 2,626					M <sup>3</sup> x10 <sup>6</sup>	
BARDHEERE	MEAN MONTHLY (GH)	Meters	- 0.64	- 1.13	-	-	0.74	0.50	1.31	1.02	1.01	1.65	1.35	- 0.17		
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec	24.25	11.14	3.45	0.66	82.17	70.02	114.20	97.35	96.78	135.50	116.70	40.67		
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	2.10	0.96	0.30	0.06	7.10	6.05	9.87	8.41	8.36	11.71	10.08	3.51		
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>	65.10	27.84	0.03	0.93	220.10	181.50	305.97	260.71	250.80	363.01	302.40	108.81		
	MONTHLY VOLUME	Percent (%)	3.12	1.33	Trace	0.04	10.55	8.70	14.66	12.49	12.02	17.39	14.49	5.21		
	ANNUAL MEANS :	MONTHLY(VOL):	173.93	M <sup>3</sup> x 10 <sup>6</sup>	DAILY(VOL):	5.70	M <sup>3</sup> x 10 <sup>6</sup>	DAILY(Q):	65.97	M <sup>3</sup> /Sec	ANNUAL DISCHARGE: 2,087					M <sup>3</sup> x10 <sup>6</sup>
	MEAN MONTHLY (GH)	Meters														
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec														
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>														
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>														
MONTHLY VOLUME	Percent (%)															
ANNUAL MEANS :	MONTHLY(VOL):		M <sup>3</sup> x 10 <sup>6</sup>	DAILY(VOL):		M <sup>3</sup> x 10 <sup>6</sup>	DAILY(Q):		M <sup>3</sup> /Sec	ANNUAL DISCHARGE: 2,087					M <sup>3</sup> x10 <sup>6</sup>	
JAVANME	MEAN MONTHLY (GH)	Meters														
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec														
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>														
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>														
	MONTHLY VOLUME	Percent (%)														
	ANNUAL MEANS :	MONTHLY(VOL):		M <sup>3</sup> x 10 <sup>6</sup>	DAILY(VOL):		M <sup>3</sup> x 10 <sup>6</sup>	DAILY(Q):		M <sup>3</sup> /Sec	ANNUAL DISCHARGE: 2,087					M <sup>3</sup> x10 <sup>6</sup>
	MEAN MONTHLY (GH)	Meters														
	MEAN MONTHLY (Q)	M <sup>3</sup> /Sec														
	MEAN DAILY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>														
	MONTHLY VOLUME	M <sup>3</sup> x 10 <sup>6</sup>														
MONTHLY VOLUME	Percent (%)															
ANNUAL MEANS :	MONTHLY(VOL):		M <sup>3</sup> x 10 <sup>6</sup>	DAILY(VOL):		M <sup>3</sup> x 10 <sup>6</sup>	DAILY(Q):		M <sup>3</sup> /Sec	ANNUAL DISCHARGE: 2,087					M <sup>3</sup> x10 <sup>6</sup>	



**J U B B A R I V E R**  
(Streamflow in  $m^3 \times 10^6$ )

STATION : LUGH GANANA

PERIOD: 1951 / 1981

Year	Jan 1	Feb 2	Mar 3	Apr 4	May 5	Jun 6	Jul 7	Aug 8	Sep 9	Oct 10	Nov 11	Dec 12	TOTAL ( $m^3 \times 10^6$ )	Max'Q' ( $m^3/sec.$ )	MIN 'Q' ( $m^3/sec.$ )
1951	205	95	76	793	1562	573	383	841	565	1559	1226	645	8523	1,030	20.6
1952	172	49	34	159	592	204	260	611	982	1612	785	117	5578 *	860	10.6
1953	53	30	31	82	434	174	640	1168	410	600	853	154	4628	650	8.8
1954	68	30	29	547	517	363	720	1310	1322	1578	347	217	7048	980	9.7
1955	71	59	34	84	233	59	136	506	689	1120	472	125	3588	676	10.3
1956	95	59	34	226	635	256	362	844	886	2105	728	166	6386 *	1,430	10.2
1957	76	48	150	150	996	697	589	680	381	522	677	439	5406	705	14.3
1958	97	101	76	72	319	1734	873	1275	1172	1240	819	619	8396	690	19.4
1959	166	48	41	102	554	529	509	565	1179	1500	1371	265	6829	1,205	8.7
1960	103	428	1152	103	41	456	645	455	581	753	990	597	6314 *	668	9.4
1961	80	60	65	586	603	422	603	1379	1052	1698	2094	1256	9899	1,320	21.0
1962	211	71	61	145	506	120	193	463	609	1361	728	308	4766	598	14.3
1963	49	39	56	734	1342	454	340	391	316	487	490	696	5393	755	13.8
1964	217	93	65	149	203	251	266	678	635	1366	816	375	5114 *	777	15.5
1965	340	91	23	28	81	36	66	132	235	1671	1283	525	4511	985	8.2
1966	136	75	87	195	562	391	337	496	899	691	715	260	4847	390	26.0
1967	79	57	70	212	678	132	447	1020	868	1848	2035	854	8300	1,105	22.4
1968	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1969	-	-	-	-	-	-	-	-	-	-	430	155	-	-	-
1970	163	137	281	630	504	855	458	659	969	1730	1353	196	7935	1,250	28.9
1971	97	67	74	156	522	422	611	568	638	1596	1052	329	6133	970	27.5
1972	138	118	144	293	822	562	587	686	596	881	1065	362	6254 *	1,065	27.5
1973	144	77	52	(65)	74	41	61	768	(687)	1213	676	20	(3878)	720	-
1974	3	0	0	41	213	474	430	608	987	617	439	56	3868	655	-
1975	12	18	14	74	182	92	558	1130	980	1049	648	88	4845	730	-
1976	42	15	22	59	1114	713	573	498	557	587	943	141	4264 *	1,095	-
1977	123	126	69	744	871	942	679	822	1090	1573	2727	695	10393	2,052	10.3
1978	185	89	585	348	723	303	1041	980	750	1624	836	401	7870	1,045	24.3
1979	164	185	140	393	(595)	790	428	560	317	734	784	728	5818	(510)	21.8
1980	58	25	16	32	289	205	400	309	335	479	245	84	2476 *	265	5.0
1981	21	8	208	2115	1472	326	309	690	1040	1146	498	198	8030	1,533	2.3
MEAN	116	80	127	321	595	434	466	727	749	1205	938	369	6113	921	15.6

Sum of Monthly Means:- 6,127  $m^3 \times 10^6$

NOTE:- Bracketed figures 1973( Lugh/Kaitoi correlation - Selchozpromexport). 1979 - Mean values used.

DATA SOURCE: A). Selchozpromexport 1965 & 1973. B). 'MPP' & Ministry of Agriculture records 1973/79. C). B.P.Gemmel 1980/81. Note that data for period 1977 to 1981 computed from -1980/81 rating curve. NOTE: The asterisk denotes leap year.

WATER LEVEL DATA QUALITY SUBMISSION

SHEBELLI & JUBBA RIVERS

( 1980 & 1981 )

1. Jubba and Shebelli ( 1980 )
2. " " ( 1981 )



JANUARY 5 10 15 20 25 FEBRUARY 5 10 15 20 25 MARCH 5 10 15 20 25 APRIL 5 10 15 20 25 MAY 5 10 15 20 25 JUNE 5 10 15 20 25 JULY 5 10 15 20 25 AUGUST 5 10 15 20 25 SEPTEMBER 5 10 15 20 25 OCTOBER 5 10 15 20 25 NOVEMBER 5 10 15 20 25 DECEMBER 5 10 15 20 25

**1980 WATER LEVEL DATA QUALITY SUBMISSION**

Recorder & Observer Data  
 0-0-00  
 Observer Data  
 Straight Tide Recession & Spout Observations  
 Spot Observations  
 Correlation (Water Levels)

**SHEBELLI RIVER**

**Belet Uen**

**Bulo Burti**

**Mahaddel Uen**

**Balaad**

**Aigo!**

**Audegla**

**JUBBA RIVER**

**Lugh Ganana**

**Bardheene**

**Mareery**

**Jamame**

DRY

NO DATA STATION CLOSED

JANUARY 5 10 15 20 25 FEBRUARY 5 10 15 20 25 MARCH 5 10 15 20 25 APRIL 5 10 15 20 25 MAY 5 10 15 20 25 JUNE 5 10 15 20 25 JULY 5 10 15 20 25 AUGUST 5 10 15 20 25 SEPTEMBER 5 10 15 20 25 OCTOBER 5 10 15 20 25 NOVEMBER 5 10 15 20 25 DECEMBER 5 10 15 20 25

JANUARY    FEBRUARY    MARCH    APRIL    MAY    JUNE    JULY    AUGUST    SEPTEMBER    OCTOBER    NOVEMBER    DECEMBER

5 10 15 20 25    5 10 15 20 25    5 10 15 20 25    5 10 15 20 25    5 10 15 20 25    5 10 15 20 25    5 10 15 20 25    5 10 15 20 25    5 10 15 20 25    5 10 15 20 25    5 10 15 20 25    5 10 15 20 25

**1981 WATER LEVEL DATA QUALITY SUBMISSION**

Reorder & Observer data.  
 Observer data.  
 Straight line regression & Spot observations.  
 Sppt. Observations.  
 Correlation (Water Levels).

**SHEBELLI RIVER**

**Belet Uen**

**Bulo Burti**

**Mahaddei Uen**

**Balaad**

**Atgoi**

**Audegile**

**JUBBA RIVER**

**Lugh Ganana**

**Bardheere**

**Mareery**

**Jamame**

NO DATA    STATION CLOSED

DRY

DRY

