

Vertical Beam Size at J19 vs. Time in Cycle

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Vertical Beam Size Measurements (data of 3/9/74)

Measurement of vertical beam size were made by intercepting 5% of the beam with vertically flapped aluminum targets.

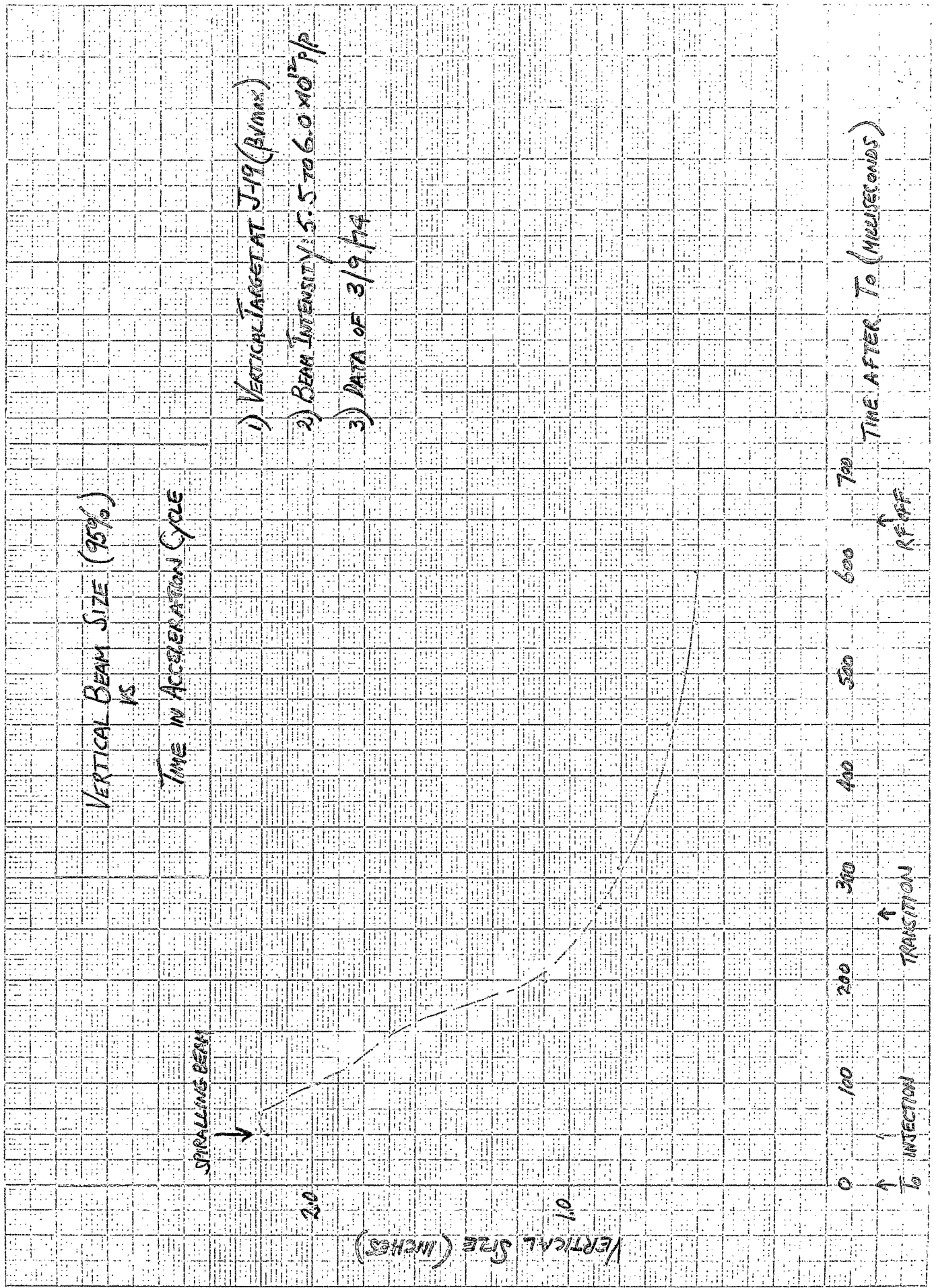
Conditions

- 1) Vertical Targets at β -max
- 2) Beam Intensity 5.5 to 6.0×10^{14} p/p
- 3) Average ring vacuum - 3×10^{-7} Torr.

Results

- 1) Initial measurements shown in accompanying graph.
- 2) H.E. beam is approx 0.5" (~ 1.2 cm) at β max.
- 3) L.E. beam is approx 2.2" (~ 5.5 cm) at β max.
- 4) Ratio (damping) is approx 4.5/1, while square root of momentum ratio is 7/1. This compares with the horizontal damping (see data of 5/10/73) of 5/1, and is larger than previously observed vertical damping (see data of 4/27/73) of about 3/1.
- 5) Previous (4/27/73) measurements at 4.0 to 5×10^{14} p/p gave a beam size at injection of about (1.25" x 1.4), 1.78 inches (β max).
- 6) At H.E. previous measurements (4/27/73) gave a beam size of about 1.4 cm (at β max).

J. M. ...
3/11/74



VERTICAL BEAM SIZE (95%)
VS

TIME IN ACCELERATION CYCLE

VERTICAL SIZE (INCHES)

TIME AFTER T₀ (MICROSECONDS)

- 1) VERTICAL TARGET AT J-19 (B.V.M.O.)
- 2) BEAM INTENSITY: 5.5 TO 6.0 x 10¹⁷ P/P
- 3) DATA OF 3/9/74

SPALLING BEAM

INJECTION

TRANSITION

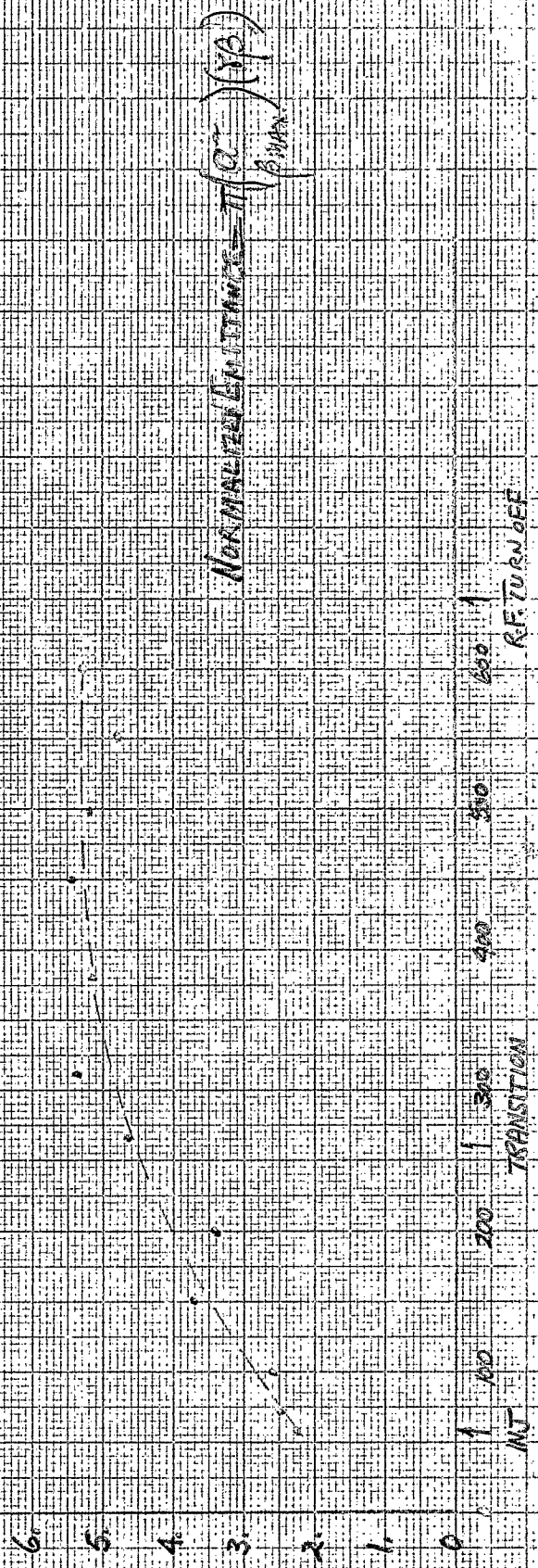
RF OFF

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NORMALIZED VERTICAL BEAM ENTRANCE VS TIME IN ACCELERATION CYCLE

NORMALIZED VERTICAL ENTRANCE - (TRAMP)

- 1) BEAM SIZE (95%) AT J-19 (β_{MAX})
- 2) (80) CALCULATED FROM BEAM FREQUENCY AND INTEGRATED $\dot{\beta}$
- 3) BEAM INTENSITY $\sim 5.5 \times 10^6 \times 10^7 P/P$
- 4) DATA OF 3/9/74



NORMALIZED ENTRANCE - $\pi(\alpha_{\beta_{MAX}})$ (TRAMP)

TIME AFTER T_0 IN MILLISECONDS

BEAM MOMENTUM
VS
TIME

30

20

10

BEAM MOMENTUM - GEV/E

0

100

200

300

400

500

600

700

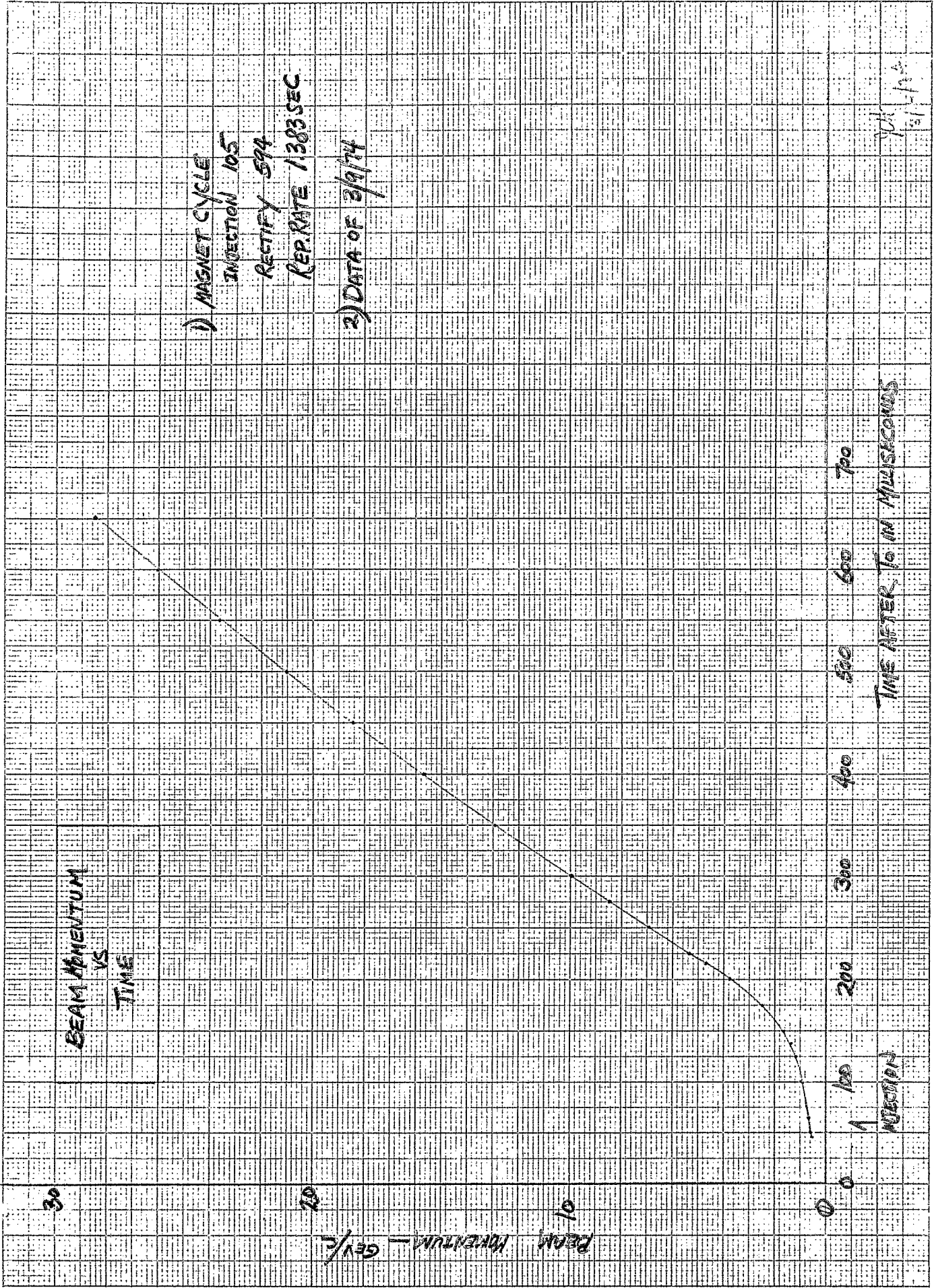
INJECTION

TIME AFTER TO IN MILLISECONDS

1) MAGNET CYCLE
INJECTION 105
RECTIFY 594
REP. RATE 1.383 SEC

2) DATA OF 3/9/74

101
101
101



10 X 10 TO THE CENTIMETER 42 534 53

GRAPHIC CALCULATOR COMPANY, CHICAGO, ILL. 60606

(BET) OF PROTON
VS
ACCELERATION TIME

DATE OF 3/9/74

30

20

10

(BET) - BETA TIMES GAMMA OF PROTON

0

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

2300

2400

2500

2600

2700

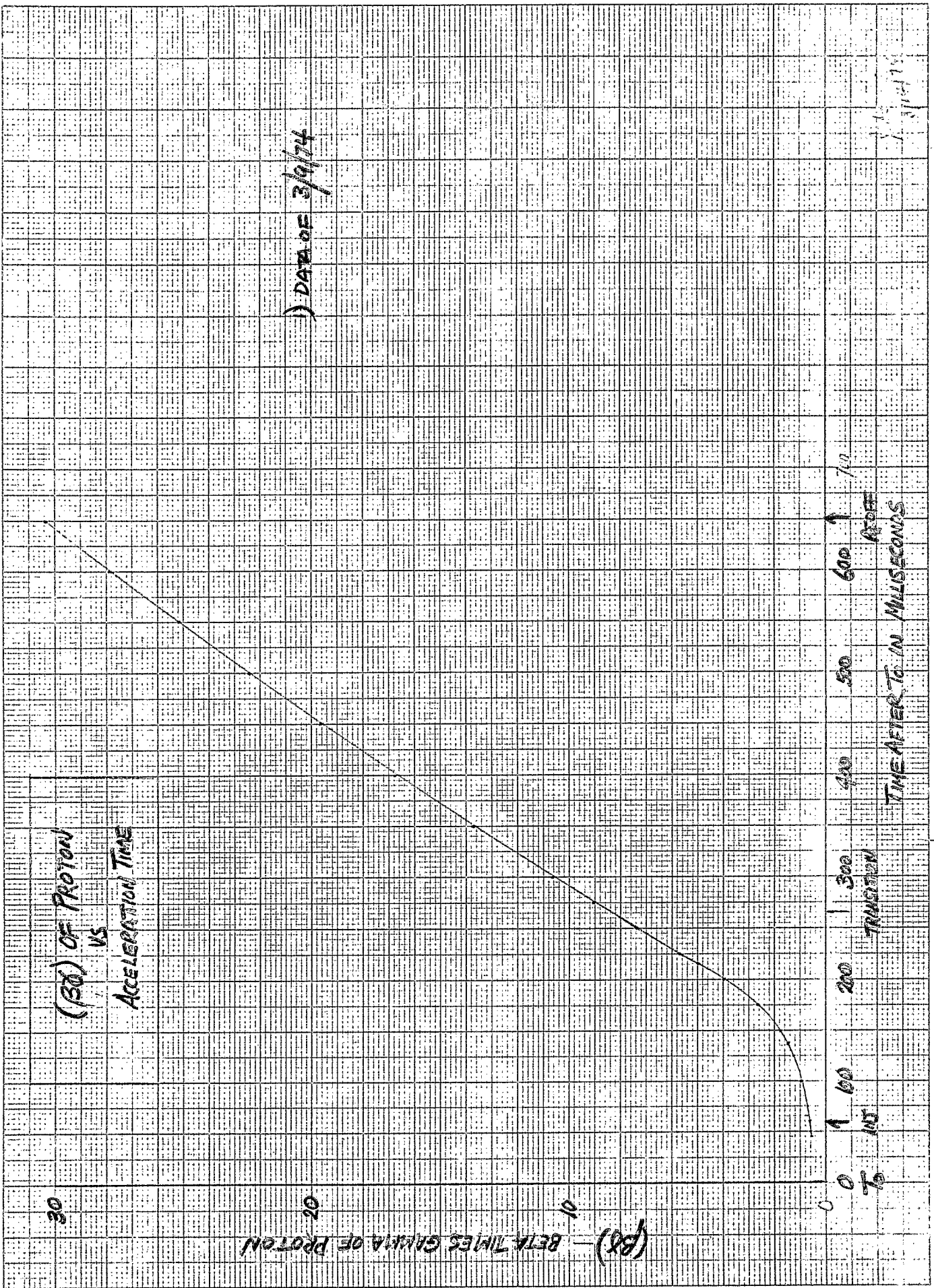
2800

2900

TRANSITION

TIME AFTER T₀ IN MILLISECONDS

1000
1100
1200



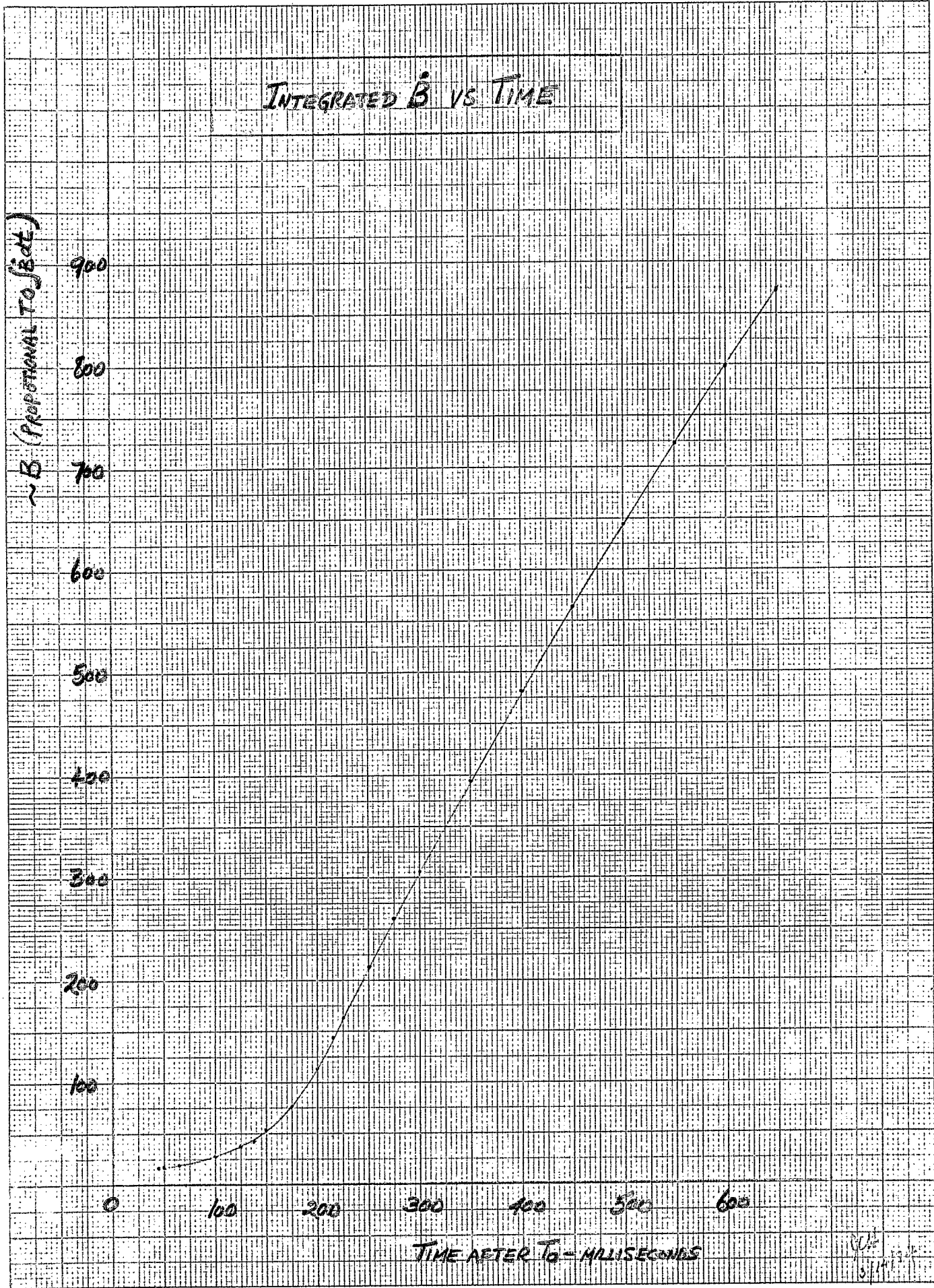
INTEGRATED \dot{B} VS TIME

$\sim B$ (PROPORTIONAL TO $\int \dot{B} dt$)

900
800
700
600
500
400
300
200
100
0

100 200 300 400 500 600

TIME AFTER T_0 - MICROSECONDS



35498F 10 X 10 THE CENTIMETER AS-6914-CO

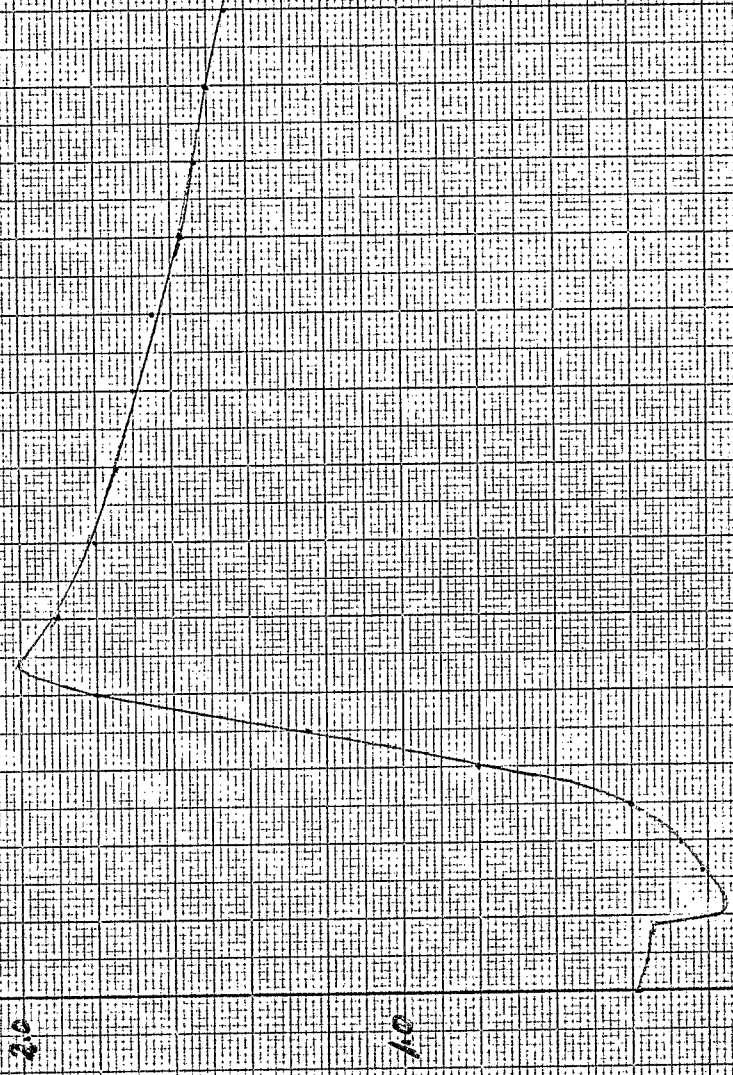
35498F 10 X 10 THE CENTIMETER AS-6914-CO

3/1/56

1) RING MAGNET D3
 2) MAGNET CYCLE -
 INJECTION - 105
 RECTIFY - 594
 REP. RATE - 1383 SEC
 3) DATA OF 3/19/74

B VS. TIME

VOLTS INDUCED IN BRUSHES - VOLTS



100 200 300 400 500 600
 TRANSITION
 TIME FROM T₀ (MILLISECONDS)

3/19/74