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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.

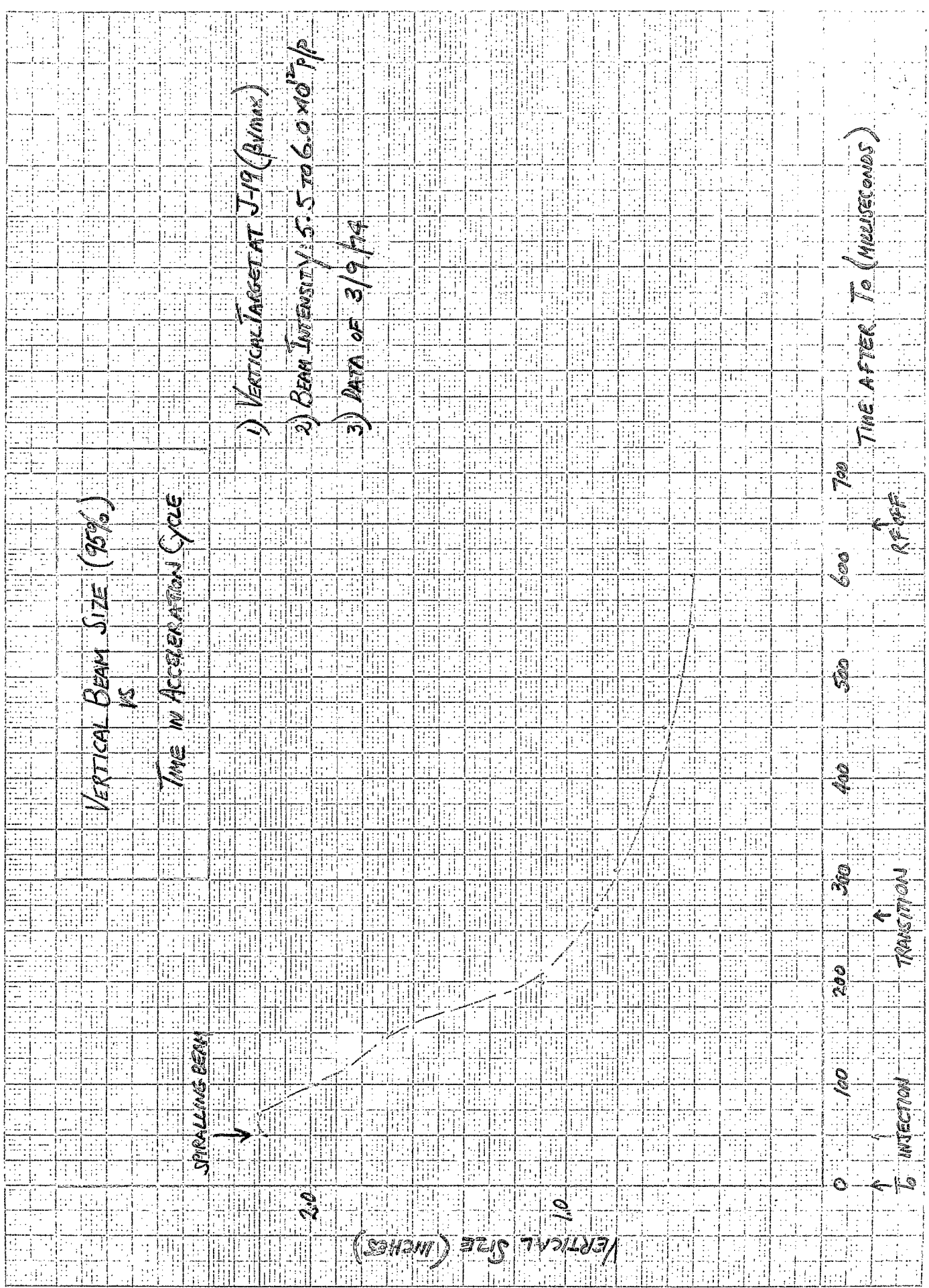
Conditions

- 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. M. -
3/11/74



NORMALIZED VERTICAL BEAM EMITTANCE
VS
TIME IN ACCELERATION CYCLE

NORMALIZED VERTICAL EMITTANCE - $(\pi \times 10^{-12})$ (p.p.)

6
5
4
3
2
1
0

NORMALIZED EMITTANCE - $\pi(a^2) (\pi \times 10^{-12})$
 (β_{max})

- 1) BEAM SIZE (95%) AT J-19 (β_{max})
- 2) (80) CALCULATED FROM BEAM FREQUENCY AND INTEGRATED $\dot{\beta}$
- 3) BEAM INTENSITY ~ 5.5 TO 6.0×10^{12} P/P
- 4) DATA OF 3/9/74

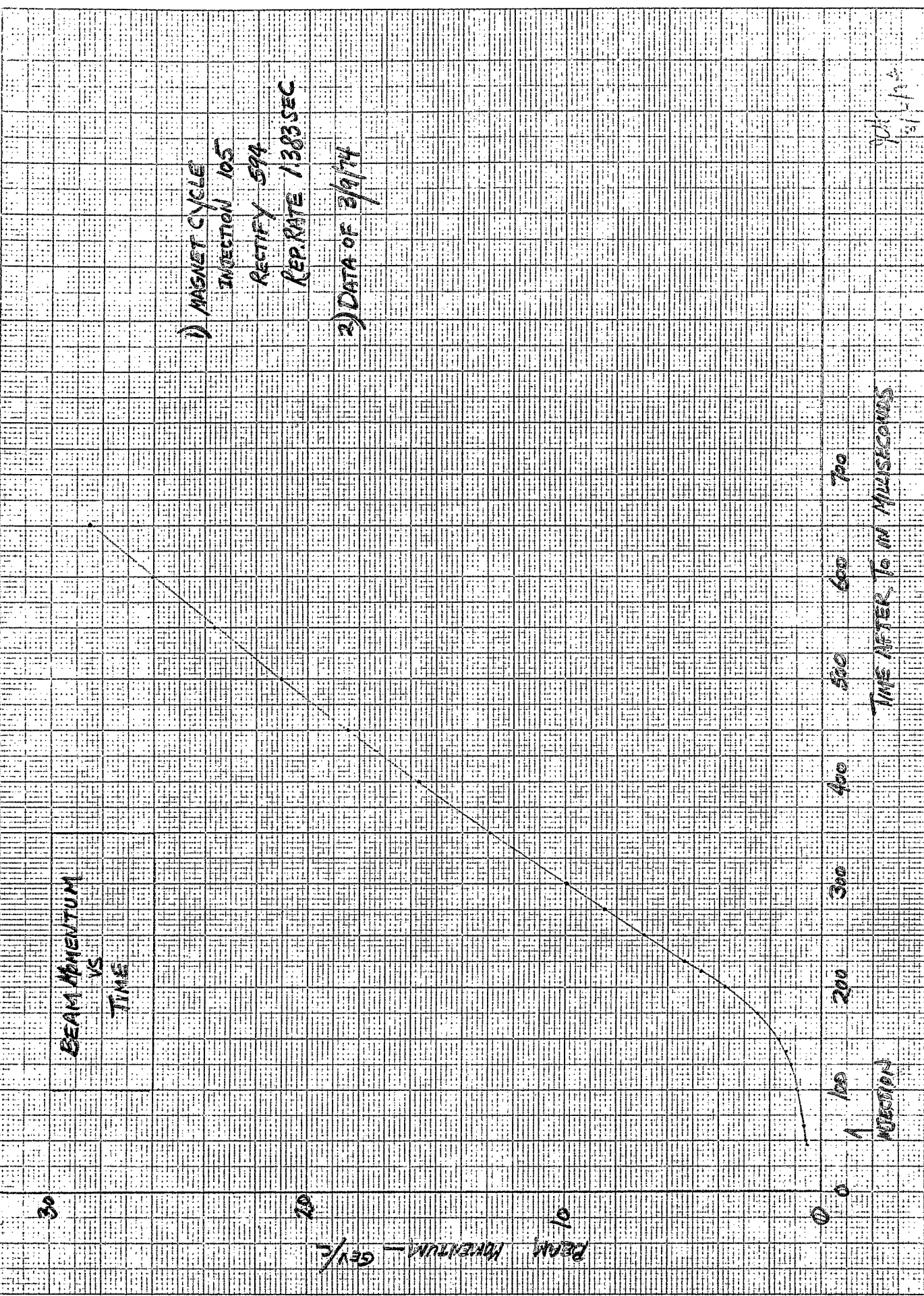
RETURN DEF

TRANSITION

TIME AFTER T_0 IN MILLISECONDS

INT

7



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

2) DATA OF 3/9/74

10 X 10 TO THE CENTIMETER A3 0014-65

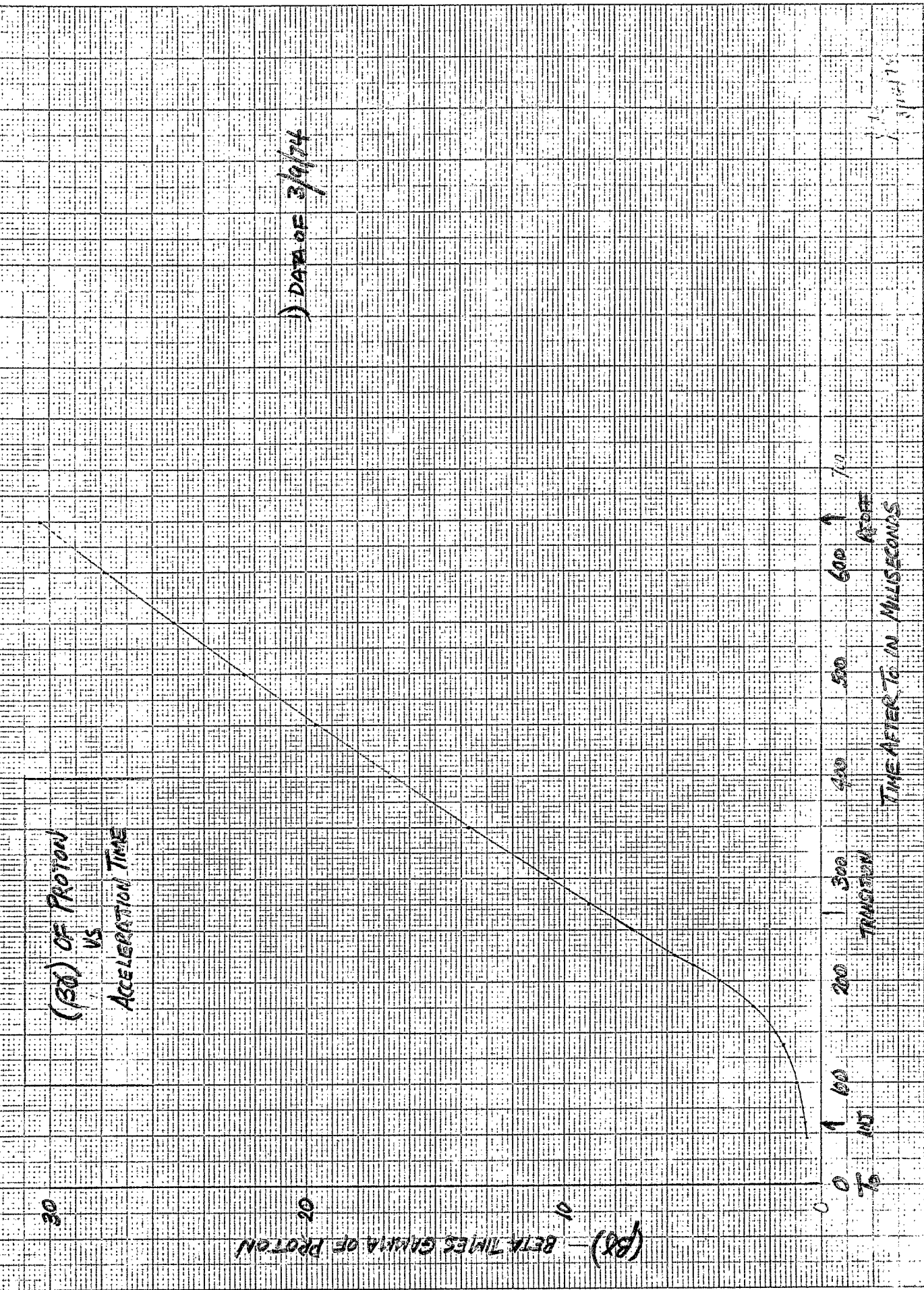
DATE 3/9/74

(30) OF PROTON
VS
ACCELERATION TIME

(30) - BETA TIMES GAMMA OF PROTON

TIME AFTER T₀ IN MILLISECONDS

3/10/74



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

30/12/72
S. J. H. 12.20

SQUARE 10 X 10 TO THE CENTIMETER AS 8014-60

GRAPH PAPER GRAPHIC CONTROLS CORPORATION BOSTON, MASS. 02111
Product No. 54

1) RING MAGNET D3

2) MAGNET CYCLE -
INJECTION - 105

RECTIFY - 594

REP. RATE - 1383 SEC

3) DATA OF 3/9/74

B VS. TIME

VOLTS INDUCED IN BOWTIE - VOLTS

TIME FROM T₀ (MILLISECONDS)

3/14/74

