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DIAGNOSTIC TECHNIQUES IN PLASMA RESEARCH

CHARLES W. NEWCOMB

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by

CHARLES W. NEWCOMB

Major, United States Army

Submitted in partial fulfillment of
the requirements for the degree of

MASTER OF SCIENCE
IN
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Monterey, California

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from the

United States Naval Postgraduate School

ABSTRACT

The construction and employment of four diagnostic probe systems in connection with a steady state plasma facility is discussed in this paper; a Hall probe for the determination of magnetic field strength within the magnetic bottle, and three Langmuir probe systems for determination of plasma temperature and density. Results obtained through the employment of the Hall probe verified theoretical planning predictions, providing data necessary for further experimental activities. Use of the single Langmuir probe in positive column plasma diagnostics was not successful but provided useful information for use in future probe circuit design, construction, and employment. Use of the double Langmuir probe provided an electron temperature value of 6.9 electron volts in the positive column at 800 microns pressure and a realistic density profile in Argon at 400 microns.

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LIST OF ILLUSTRATIONS

1. Introduction.

During the summer and fall of 1963, operations at the Plasma Study Facility of the United States Naval Postgraduate School were enhanced by the addition of equipment designed to increase the magnetic field available within the plasma generating system and by improvements and modifications to the equipment providing the required high vacuum. Prior to the reinitiation of experimentation, it was necessary to design and construct certain measuring devices to be used either in establishing operational parameters or as experimental tools.

The very nature of highly ionized plasma with its sensitivity to contact perturbations, its low pressures, and the complex, enclosed machinery used in its generation, indicate the desirability of the use of the probe as the primary diagnostic tool in experimentation with the plasma. The term, probe technique, envisions the introduction into the area of interest, by remote control, of electrodes or radio waves, which then, under the effect of the plasma, send electronic data back out to the necessary measuring equipment.

This paper discusses the use of two such techniques utilized in connection with the Plasma Facility. The first is a Hall Probe designed for the accurate measurement of the vacuum magnetic field strength within the plasma column area, and the second, three Langmuir probe systems for measuring various internal plasma parameters.

2. The Plasma Facility. (Fig. 1)

The Plasma Facility at the Postgraduate School was designed for the purpose of investigating the containment of a highly ionized plasma within a magnetic "bottle." It consists, basically, of a Pyrex Glass pipe, four inches in diamater, by eight-to-ten feet in length, enclosed by six circular air core magnets in series, and connected to a high vacuum system. Plasma generating electrodes are mounted at the ends of the pipe, and side ports evenly spaced along the pipe permit the insertion of necessary diagnostic equipment. The magnet system was designed to provide up to 10,000 gauss with a maximum of 2.5% axial variation. [1]

3. Magnetic Field Measurements.

Prior to application of Langmuir probe techniques to the operating plasma, it was necessary to establish accurately the magnetic field strength at various axial and radial positions within the tube at various magnet current settings. This was done to provide constant environmental parameters for later experimentations. The magnet system, with the six magnets operating, was designed to provide up to 10,000 gauss with input currents of 168 amperes per kilogauss. Due to magnet current input metering difficulties, however, initial field measurements were made at settings of 340 and 500 amperes rather than the even-kilogauss current settings of 336 and 504 amperes.

The principal problem faced in the measurement of the field was that of accurately positioning the measuring equipment within the plasma tube. Conventional gaussmeters or nuclear resonance probes could not be inserted into the tube at the desired positions. In addition, the strong magnetic field surrounding the operating facility dictated that the metering head and the electrical circuitry be well separated.

To overcome the problems enumerated above, a standard Hall axial probe was prepared as discussed in the following pages.

To provide accurate positioning, a one-inch aluminum pipe, ten feet long, was machined to fit through two plastic templates (Fig. 2), which would be mounted at each end of the plasma tube. Each template was constructed from plastic discs designed to fit into standard vacuum collars. Thus each template contained a circular groove cut to fit a standard "O" ring. Use of the "O" ring facilitated accurate centering of the template on the plasma tube. Cross hairs were scribed onto the templates to allow for azimuthal alignment with a carpenter's level. Four overlapping,

one-inch holes were cut, one-half an inch apart on an axis radially from center. These provided the positioning for four radial measurements for each setting of the templates. Center sag in the pipe was reduced by use of a floating template positioned through a center port into the plasma tube. Irregularities in the inner diameter of the tube prevented accurate vertical positioning, but measurements well within 0.1 inch of true were obtained.

The probe itself was encapsulated in a plastic trailer (Fig. 3) with a long 4-wire cable attached to the input and output terminals of the probe. Metal prongs were affixed to each end of the trailer to provide connections for the motion controlling strings. To the end opposite from the terminals was attached a weight by a string sufficiently long to enable maintenance of tension on the pulling string with the probe at any point within the tube. To the other end was attached a calibrated string zeroed at the operating end of the Hall probe. This provided the positioning indicator.[1] The outer face of the anode magnet was used as the reference zero for measurements described in this paper.

The encapsulated probe was calibrated in a variable magnetic field against a Nuclear Magnetic Resonance (NMR) probe accurate at 5000 gauss to ± 5 gauss. Measurements were made at 500 gauss intervals from 1000-5000 gauss and then plotted as shown in Fig. 4. The circuitry used is that indicated in the schematic in Fig. 3 consisting basically of a steady 100 milliampere current fed into the probe with probe output voltages being read across a four ohm resistor with a potentiometer readable to ± .05 millivolts. The nine calibration points were fed into a "least

[1] It is recommended that a "tape measure" metal tape be used in lieu of the string, reducing somewhat the minor inaccuracies due to string stretch.

square" curve fitting program on the CDC 1604 computer and a best fit curve obtained. After recomputation of the original nine points as a program check, a tabulation of all field values evaluated from potentiometer readings of from 3.00 - 28.99 millivolts was printed out for use in measurement at the plasma facility (Appendix A).

The probe system was assembled and mounted in the plasma tube. The initial run consisted of measurements one inch apart down the pipe at a magnet current setting of $500<I<510$ amperes, this current designed to give 3000 gauss in the operating section of the tube. Plotting these points (Fig. 5) verified the theoretical prediction of less than 2.5% linear variation. Actual variation was $\pm$65 gauss in 2935 or 2.2%. At this time a standard deviation determination was made at the inch 39 position, yielding a standard deviation of $\pm$.04 millivolts or 7 gauss, or the same order of accuracy as that obtained in the calibration. Three more series of measurements were made in the horizontal axial plane at one-half inch intervals from center. For these measurements a magnet current of 500 amperes was used, for reasons of better reproducibility. Field variations along this plane from strengths at the axis were less than the standard deviation (Fig. 6).

A final field measurement was made at inch 39 of the azimuthal variation. At a magnet current setting of 500 amperes, measurements were made at 45-degree intervals around the tube. Field strengths at each of the nine points were within one standard deviation of the mean (Fig. 7).

Thus, the Hall probe measurements verified the field strength and the linearity predicted. The study group will continue to expand field strength data at such times as do not interfere with experimentation under vacuum.

4. Langmuir Probe Theory.

Two of the important physical parameters used in the determination of plasma containment characteristics are the temperature and density of the electrons and ions in the plasma. The application of electrostatic probes in the determination of these parameters has been fairly common since initially conceived by Dr. Irving Langmuir in 1924, and the probes themselves are termed Langmuir probes for this reason.

The general theory for the application of Langmuir single probes, according to Glasstone and Lovberg [2], is as follows:

Assume the insertion of a small insulated wire into the plasma and the application of a potential to this probe. As the potential is varied from a large value negative to the plasma up through zero to a large positive value, the current drawn from the probe will, if plotted against applied potential, approximate the curve in Fig. 8.

When the probe is charged strongly negative with respect to the plasma it will accept only positive ions developing a current as indicated on the figure from A to B. The arrival of ions at the probe is due only to random ion motion and therefore remains relatively constant, the slight upward trace being due to a small electron current, always statistically possible. As the potential is made less negative an increasing number of electrons strike the probe. As indicated at point C on the figure, a balance is achieved with an equal number of electrons and ions entering the probe and developing therefore a zero current. Then as the potential is made more positive, the electrons increasingly outnumber the ions.

As the electrons and ions arrive in the vicinity of the small electrode, a build-up of negative charges takes place, forming a charged "sheath" across which the electrons must travel to reach the probe.

Consequently, only those electrons with sufficient energy to overcome this charged barrier will reach the probe and develop a current. If the potential difference across the sheath is V, then the energy required by an electron to cross it will be eV. Assuming the Boltzman distribution laws apply within the plasma, the probability that a given electron will have that energy **is:**

$$\exp\left(-eV / kT_e\right)$$

and the density ratio will be:

$$\frac{n_p}{n_e} = \exp\left(-eV / kT_e\right) \qquad (4.1)$$

where n_p is the electron density at the probe and n_e the density within the plasma.

Since the electron current given to the probe is proportional to the rate at which the electrons reach the probe (or to the density), we may say that:

$$i_e = i_{re} \exp\left(-eV / kT_e\right) \qquad (4.2)$$

where i_{re} is the random electron current.

At point D, the potential across the sheath is zero, allowing maximum electron current (barring secondary emission). The potential across the sheath at any other point is then:

$$V = V_d - V_p$$

where V_p is the applied potential at any point and $V_d = V_p$ at point D (a constant of the experiment).

Replacing V in equation 4.2 by its value above and taking the logarithm of both sides we have:

$$\ln i_e = \ln i_{re} - \frac{eV_d}{kT_e} + \frac{eV_p}{kT_e} \quad \text{or:}$$

$$\ln i = \left[\ln i - \frac{eV_d}{kT_e}\right] + \frac{e}{kT_e} V_p \qquad (4.3)$$

Consequently a plot of $\ln i_e$ against V_p should give a straight line of slope $\frac{e}{kT_e}$ from which the electron temperature can be determined.

From purely kinetic considerations, it can be further shown that:

$$i_{re} = Aen \left[\frac{kT_e}{2\pi m_e}\right]^{1/2} \qquad (4.4)$$

With T_e determined from the slope of the i_e vs V_p plot, i_{re} from the value of i_{re} and A as the probe surface area, the electron density n_e can then be determined.

In a similar manner, the ion density can be found from:

$$i_{ri} = 0.40\, Aen_i \left[\frac{2kT_e}{m_i}\right]^{1/2} \qquad (4.5)$$

The above relationships were developed under the assumption that the probe size is much smaller than the mean free path of the particles within the plasma, which condition being met in the absence of a magnetic field. However, with the use of magnetic fields such as are envisioned for this facility and for later developments in the fission power field, the mean free paths are reduced essentially to the Larmor radii, which are smaller than any known matter probe. The impact of this development on the Langmuir theory is not yet completely known, although experiments have shown that determination of electron temperatures should not be affected. [3]

A possible solution to these problems is the use of connected double

probes separated by a fixed potential difference. A symmetric system of this nature should result in a characteristic curve similar to the one shown as Fig. 9. From this plot, the electron temperature can be obtained by using the relation:

$$\frac{dI}{dV} = \frac{e}{\kappa T_e} \frac{i_{1+} \times i_{2+}}{i_{1+} + i_{2+}} \qquad [4]$$

Experimental confirmation of this is continuing and will be the subject of further research by the Plasma Study group at the Postgraduate School in conjunction with the use of other techniques.

5. Probe Design and Construction.

The progressive development of the experimental sequence involving the plasma facility envisioned investigation initially of positive column characteristics followed by experiments with plasmas generated by the reflex-arc technique. Due to the lower plasma temperature, the metallic tip of a given probe could be left in the plasma for longer periods without danger, whereas in a reflex-arc generated plasma this cannot be done. For this reason, two Langmuir probe systems were designed: a stationary single probe to be used with the positive column, and a rotating single probe system for the reflex-arc plasma. Results with the stationary probe were not successful and a double probe system was developed.

The probes themselves are relatively simple instruments consisting of 5 - 10 mil tungsten wire, enclosed for all its length except the last 2 - 3 millimeters in an insulating ceramic casing and attached via a mechanical support to an external electric or electronic circuit. The principal difficulty in probe employment or systems design lies in this electronic circuitry, therefore the discussions of these three systems will consist primarily of explanations of their circuitry and the recording equipment employed. The circuitry for the two single probe systems is identical except for gating techniques required with the rotating system.

6. The Stationary Single Probe.

Although the results obtained from data collection using the single probe system were not satisfactory, a brief discussion of its electrical circuitry is included as a basis for further study. The form of the curves produced was similar to that expected, but data on electron temperature obtained from these curves was several orders of magnitude too high and attempts to determine relative electron densities rendered erratic results.

The principal problems in probe circuitry are threefold. First there is the problem of raising the probe to the floating potential existing in the plasma at the point of introduction and then varying the potential around that point. Secondly, the problem of coupling the probe (at a potential ranging from 200 - 1000 volts above ground) to the recording equipment accepting only millivolts. And then, thirdly, the problem of reading data obtained during a voltage variation of plus or minus 200 - 300 volts rapidly enough so as to avoid major voltage fluctuations in the plasma column itself.

Fig. 10 displays a circuit designed to resolve these problems. This circuit consists of three basic components. Section A is a power supply capable of providing up to 1000 volts DC with current not exceeding 25 milliamperes. Applied through a variable resistor or potential divider this brings the probe up to plasma potential minus one half of the variation desired. Section B provides the variation and consists of batteries as desired. Section C, consisting of batteries providing up to 1000 volts provides back voltage to allow the probe current variations to be displayed on a recorder. The circuit may be used with only Section A connected if point by point voltage and current readings are made using

standard meters. However, a recorder allows much more rapid voltage variations. A high response recorder with no drift or drag must be used.

7. Stationary Double Probe System.

A double probe system was designed in an attempt to overcome difficulties developed in the use of the single probe. See Fig. 11.

In this circuit, the two probes are separated by a small potential difference, the value of which can be varied over a small range (50 - 100 volts). The current which is developed between the probes is then read on any convenient recording instrument. The problem here is that the probes, when inserted into the column, pick up the floating potential of the plasma at that point which may be as high as 1000 volts or more. For this reason, the operating circuit must be insulated from ground. In the case of this circuit, this was accomplished by using the extremely large bank of resistors indicated. Voltages for recording equipment may be tapped from any single resistor as desired.

8. The Rotating Probe System.

In the positive column plasma generation system, diagnostic probes may remain indefinitely in the plasma. However, with a reflex-arc system plasma temperatures will be such that the probes would be damaged if so left. For this reason, a system was developed to enable the rapid in and out motion of a probe through the plasma column, maintaining the tip of the probe in the arc itself only a small fraction of the time. This system is diagrammed as Fig. 12.

The instrument was built and vacuum tested but was not employed with the facility since work during the period of this paper was limited to positive column experimentation. Circuitry for the system was designed as shown in Fig. 13, but was not constructed.

9. Employment of the Langmuir Probe.

The use of the single probe with the circuit shown in Fig. 10 was not satisfactory in its yield of applicable results. Although data curves were similar in form to those expected, temperature values and density relationships obtained from these curves were not realistic.

One such temperature plot is shown as Fig. 14. The data points represented by circles delineate a direct probe voltage versus probe current plot. The straight line marked I_i represents the saturated ion current; the line marked I_e was obtained by deleting the positive ion current from the direct readings and represents the increase in electron current. A logarithmic plot of the I_e straight line portion yielded an electron temperature value of approximately 35 eV, some 5 - 10 times that expected. Other runs yielded similar results.

Figure 14 represents an attempt to obtain relative density values along a line perpendicular to the plasma beam from the beam center outward to the walls of the pipe. Instead of obtaining relatively flat saturation ion current plateaus, continually decreasing values of ion current were obtained. As this was also noticed in later use of the double probe system, it appears that this is caused by the magnetic field.

In an attempt to overcome the problem of inconsistent data developed with the single probe system, a jury-rig double probe circuit was constructed prior to the completion of the circuit shown in Fig. 11. This circuit involved the simple application of approximately -50 to +50 volts between two probes, with no attempt to ground the system. Two separate runs were made with the circuit, one to determine electron temperature as a function of magnetic field and one to obtain relative densities at various radial positions within the pipe. The characteristic curve shown

in Fig. 16 is a plot of probe current versus probe voltage with facility operating parameters as shown on the graph. The slope of the center portion of the curve was used in computing an electron temperature of 6.9 electron volts. Data taken at magnet current settings of 750 and 1000 amperes produced current versus voltage values varying from the one illustrated within the experimental error only.

Fig. 17 illustrates two density profiles developed at field values of 1800 and 6000 gauss.

10. Conclusions and Acknowledgements.

Since probe characteristic curves obtained with the single probe circuit were similar in form to those expected, it can be assumed that the plasma and the probes in the plasma were working as predicted, but that the single probe circuit is not suitable for plasma diagnostics under the turbulent conditions obtained. It is recommended that continued development of the double probe system be made and that probe characteristic curves be developed under all conditions of magnetic field and gas pressure, and with different gases.

The author wishes to express his appreciation to Professors A. W. Cooper and K. H. Woehler and to Mr. Harold Herreman, Mr. Robert Smith and Mr. Peter Wisley for their kind patience, cooperation, and technical guidance.

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3. Glasstone and Lovberg, op cit: p. 198.

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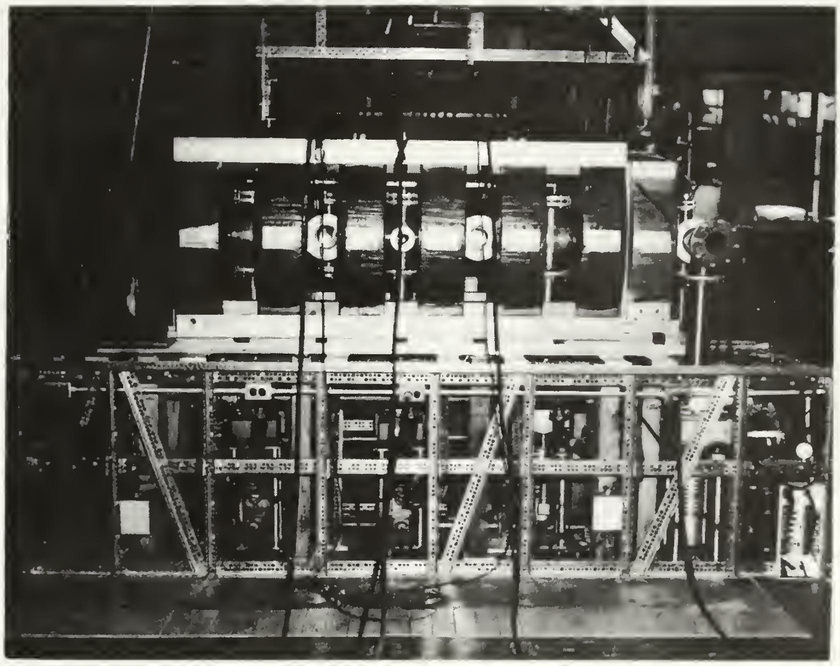


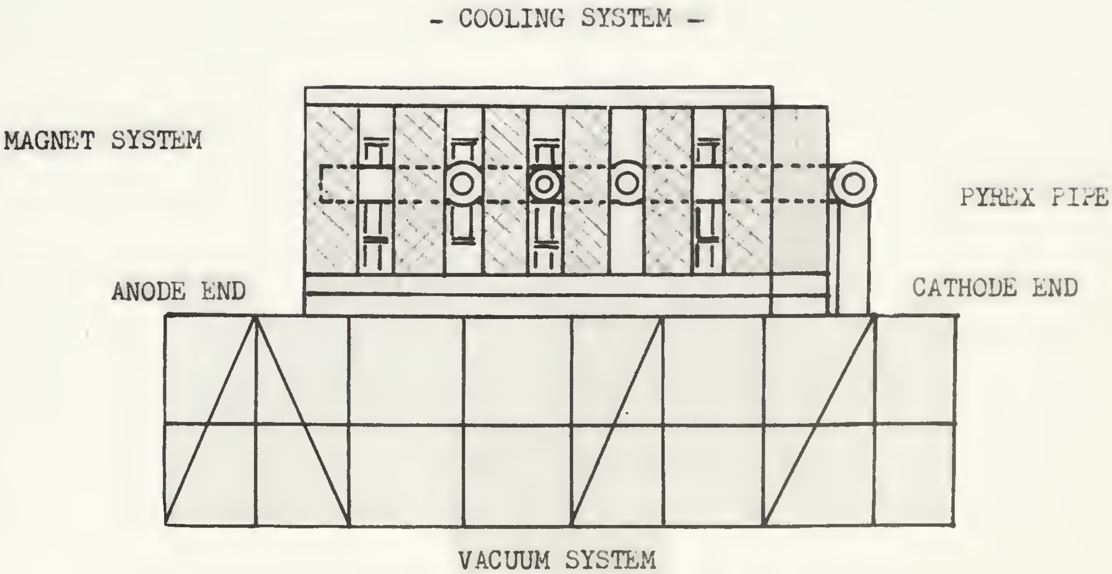


FIGURE 1

PLAN OF PLASMA FACILITY

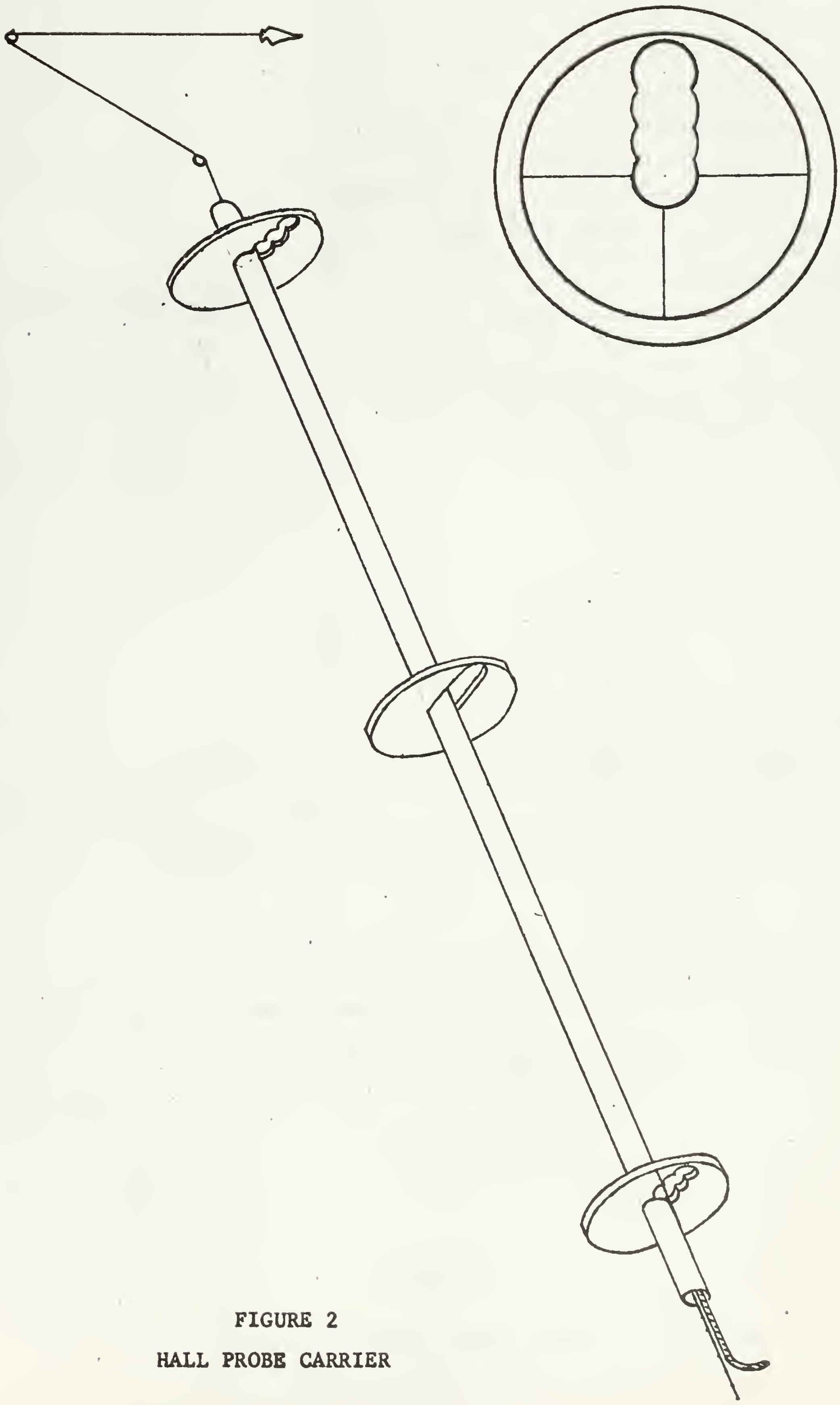


FIGURE 2

HALL PROBE CARRIER

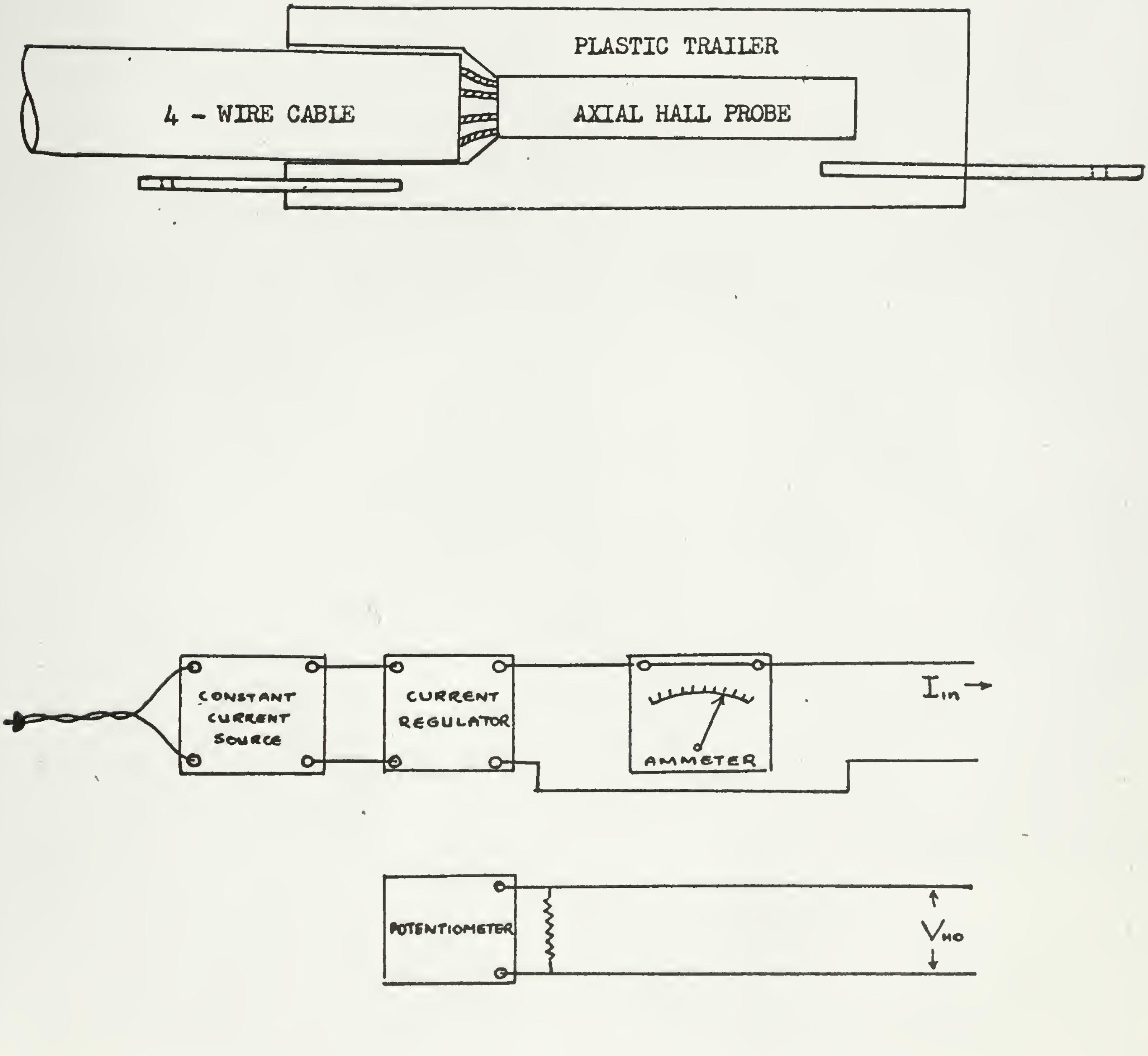


FIGURE 3

HALL PROBE DEVICE AND CIRCUITRY

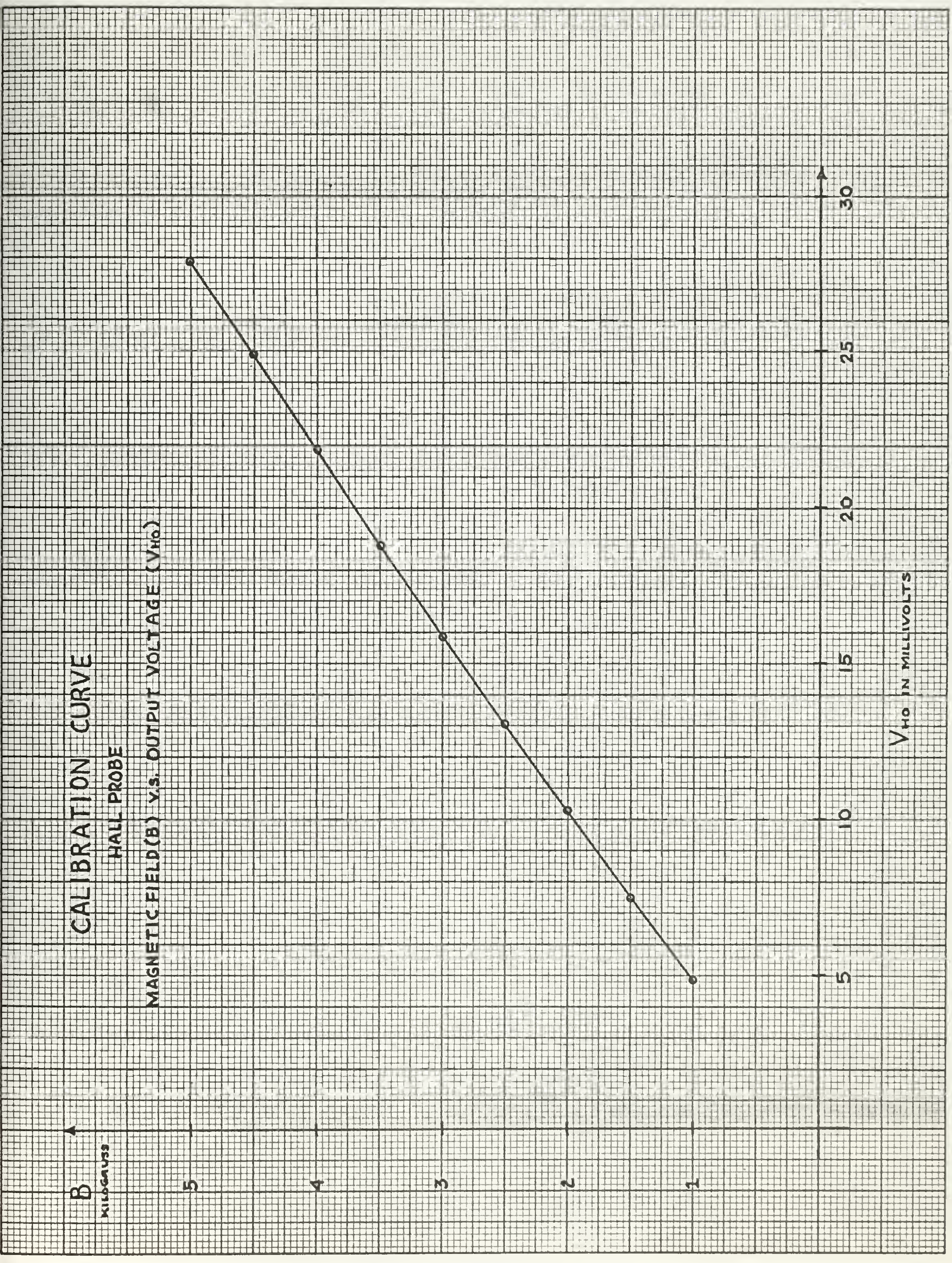
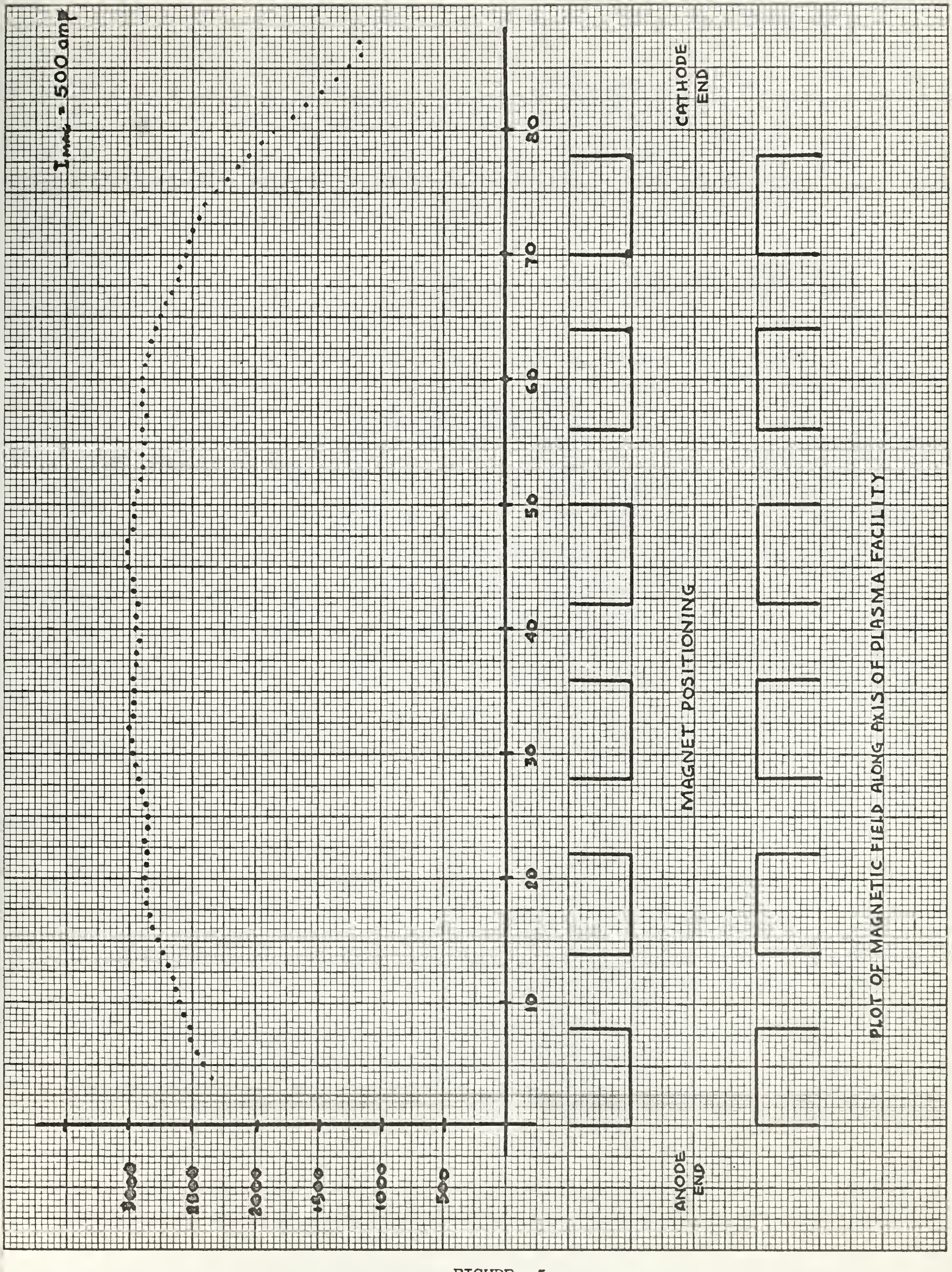

CALIBRATION CURVE
HALL PROBE
MAGNETIC FIELD(B) V.S. OUTPUT VOLTAGE (V_HO)
B
KILOGAUSS
5
4
3
2
1
5
10
15
20
25
30
V_HO IN MILLIVOLTS

FIGURE 4



I_{max} = 500 amp
CATHODE END
80
70
60
50
40
30
20
10
MAGNET POSITIONING
PLOT OF MAGNETIC FIELD ALONG AXIS OF PLASMA FACILITY
ANODE END
3000
2500
2000
1500
1000
500

FIGURE 5

INCH	I	II	III	IV	INCH	I	II	III	IV	INCH	I	II	III	IV	INCH	I	II	III	IV
1					26	2887	2858	2859	2840	51	2952	2889	2875	2886	76	2237	2251	2251	2273
2					27	2912	2879	2865	2856	52	2931	2868	2854	2872	77	2141			
3					28	2931	2886	2887	2880	53	2907	2854	2836	2854	78	2056	2072	2088	2074
4	2362	2329	2340	2344	29	2963	2898	2908	2886	54	2905	2852	2827	2833	79	1953			
5	2420				30	2975	2939	2929	2926	55	2889	2858	2829	2831	80	1841	1863	1868	1865
6	2478	2452	2445	2452	31	2987	2950	2935	2942	56	2905	2859	2861	2845	81	1723			
7	2516				32	3004	2970	2949	2926	57	2896	2852	2856	2840	82	1609	1626	1631	1622
8	2545	2525	2528	2514	33	2994	2980	2952	2938	58	2908	2852	2863	2847	83	1497			
9	2572				34	2985	2977	2959	2936	59	2903	2861	2854	2852	84	1380	1403	1403	1391
10	2615	2588	2574	2570	35	2984	2956	2959	2922	60	2903	2854	2836	2840	85	1272			
11	2640				36	2985	2947	2936	2910	61	2882				86	1165	1188	1183	1185
12	2676	2658	2633	2633	37	2957	2938	2922	2905	62	2859	2812	2824	2817	87	1181			
13	2714				38	2952	2915	2908	2889	63	2836				88	1001			
14	2746	2719	2712	2701	39	2942	2915	2894	2889	64	2810	2758	2767	2744	89	928			
15	2788				40	2943	2912	2905	2893	65	2760				90	866			
16	2822	2790	2783	2780	41	2963	2928	2891	2894	66	2712	2687	2692	2674	91	824			
17	2850				42	2942	2935	2901	2905	67	2687				92	783			
18	2870	2833	2833	2822	43	2984	2931	2926	2922	68	2631	2619	2615	2610	93	754			
19	2881				44	2987	2952	2935	2938	69	2606				94	729			
20	2893	2863	2865	2849	45	3013	2961	2935	2949	70	2555	2543	2537	2546					
21	2887	2856	2850	2847	46	3013	2957	2938	2950	71	2539								
22	2884	2856	2856	2847	47	3011	2950	2940	2966	72	2512	2487	2487	2487					
23	2894	2850	2836	2840	48	2989	2938	2929	2942	73	2463								
24	2886	2847	2845	2833	49	2978	2936	2922	2915	74	2414	2394	2396	2400					
25	2881	2847	2850	2831	50	2970	2919	2887	2915	75	2344								

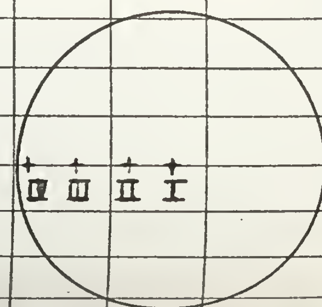
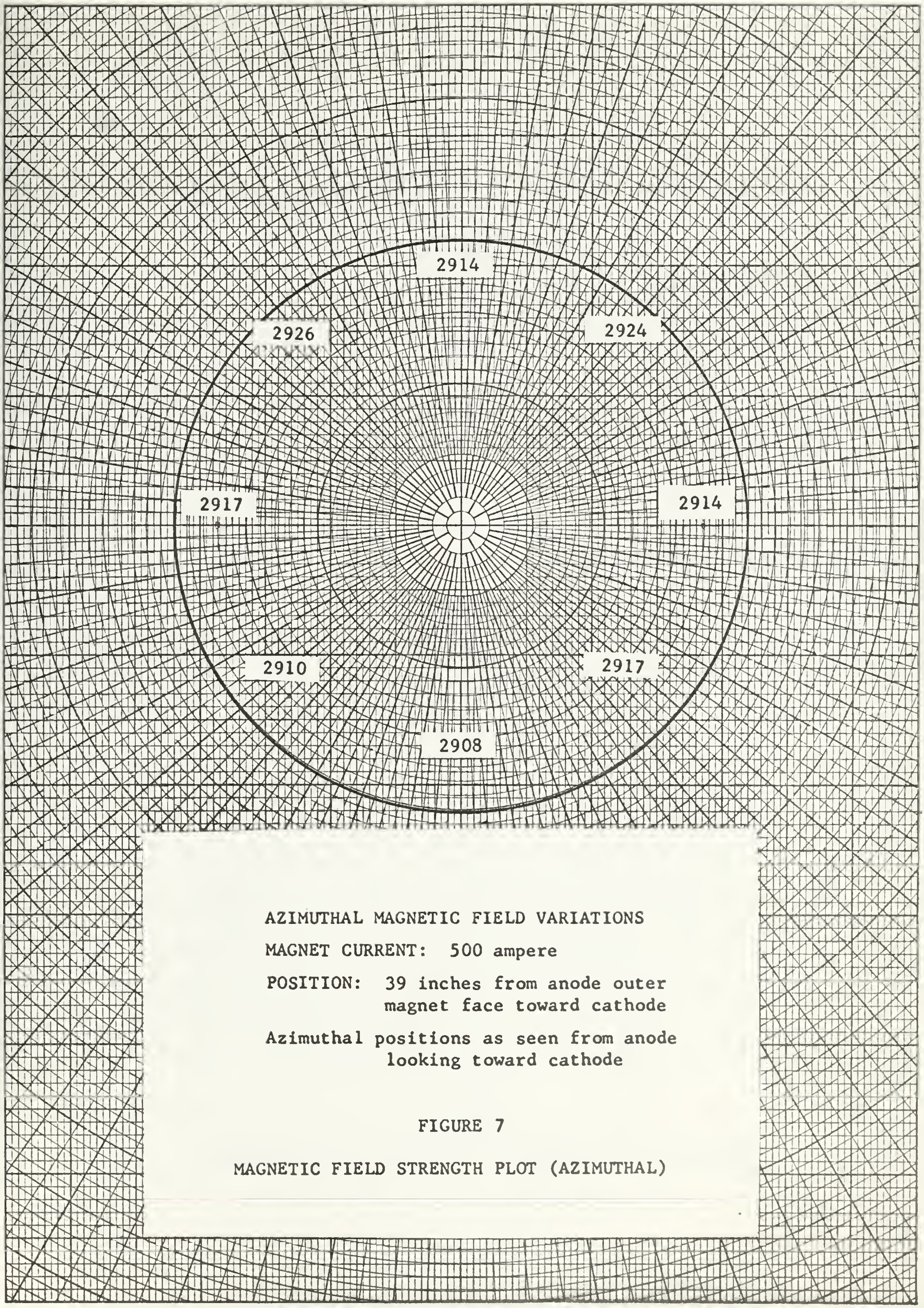


FIGURE 6 – MAGNETIC FIELD STRENGTH TABULATION



AZIMUTHAL MAGNETIC FIELD VARIATIONS

MAGNET CURRENT: 500 ampere

POSITION: 39 inches from anode outer magnet face toward cathode

Azimuthal positions as seen from anode looking toward cathode

FIGURE 7

MAGNETIC FIELD STRENGTH PLOT (AZIMUTHAL)

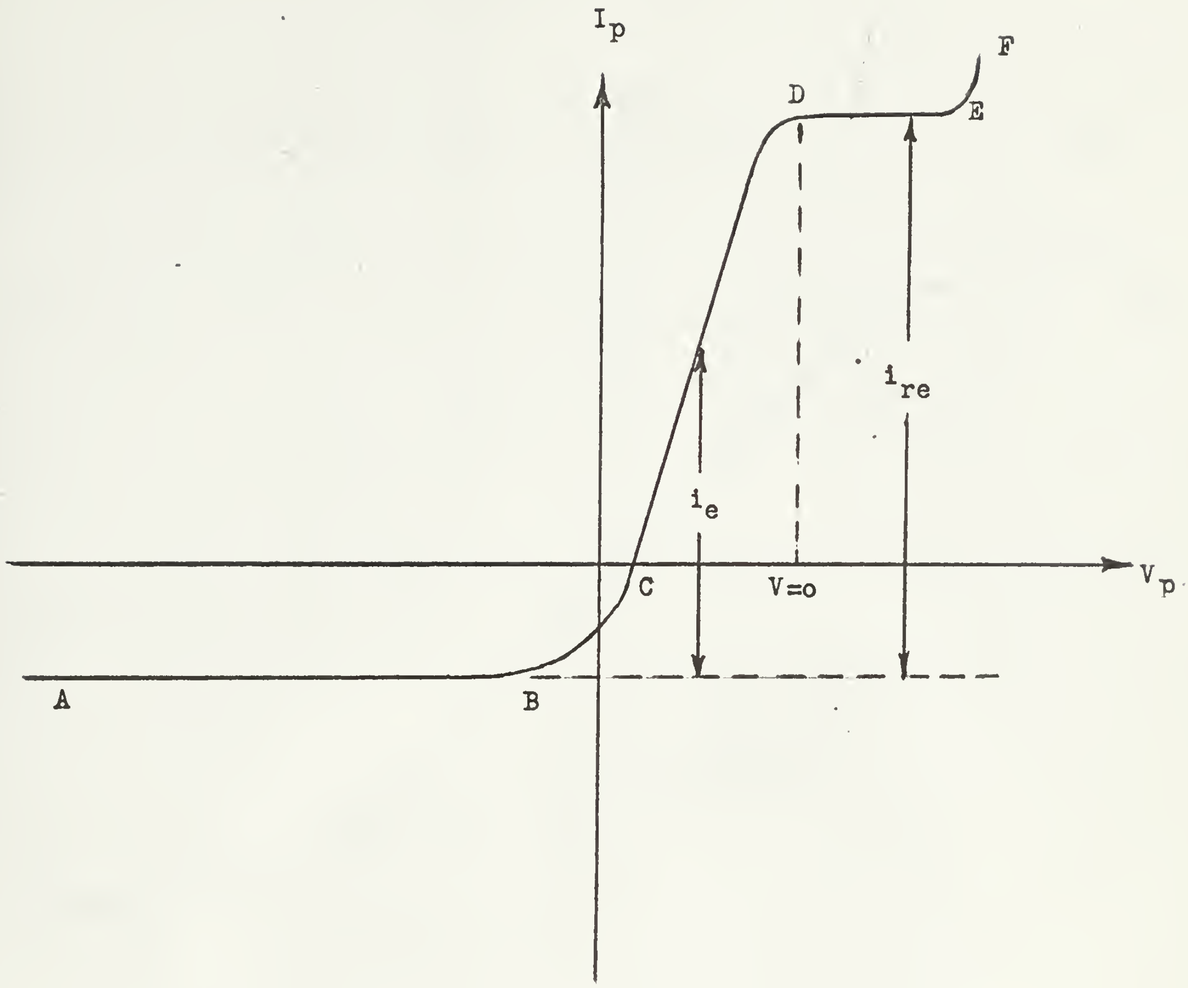


FIGURE 8

IDEALIZED PROBE CHARACTERISTIC CURVE (SINGLE PROBE)

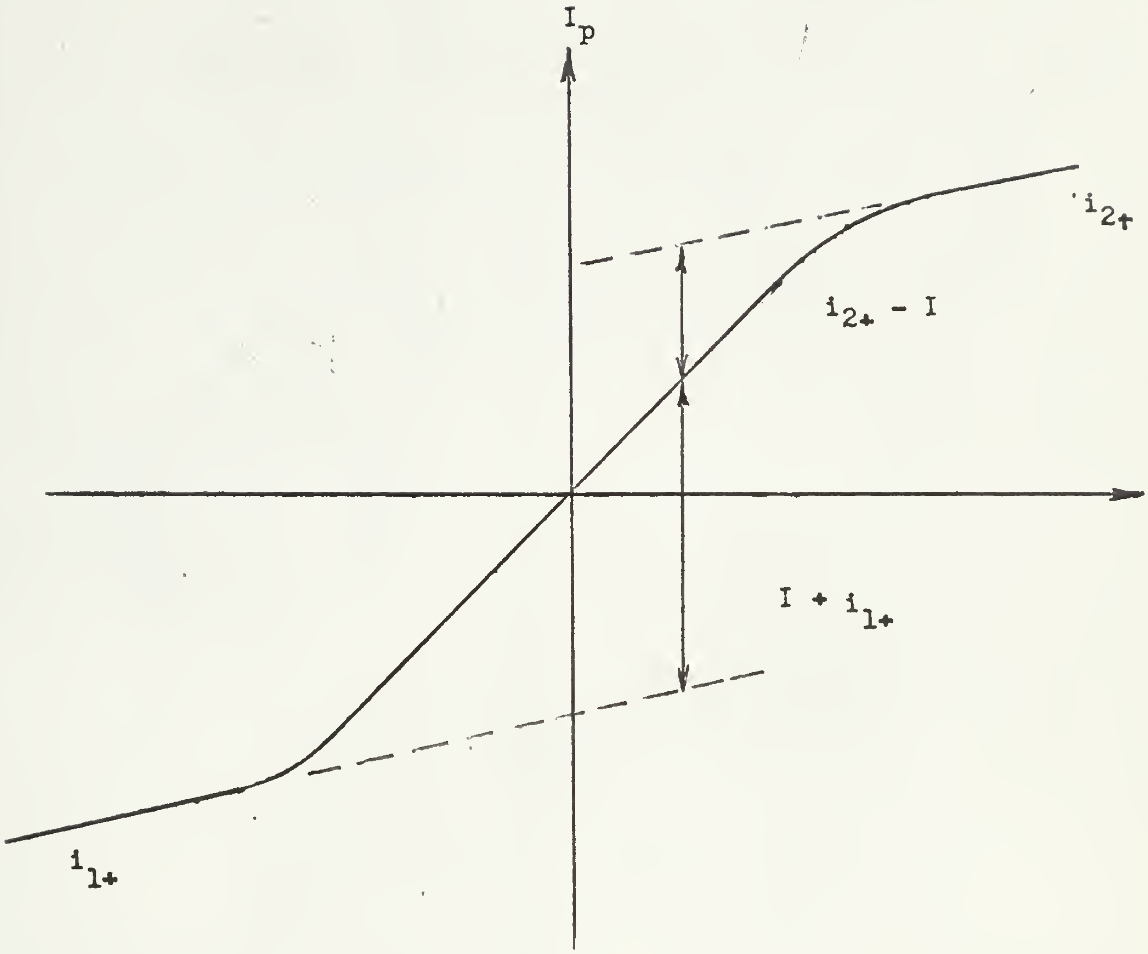


FIGURE 9

IDEALIZED PROBE CHARACTERISTIC CURVE (DOUBLE PROBE)

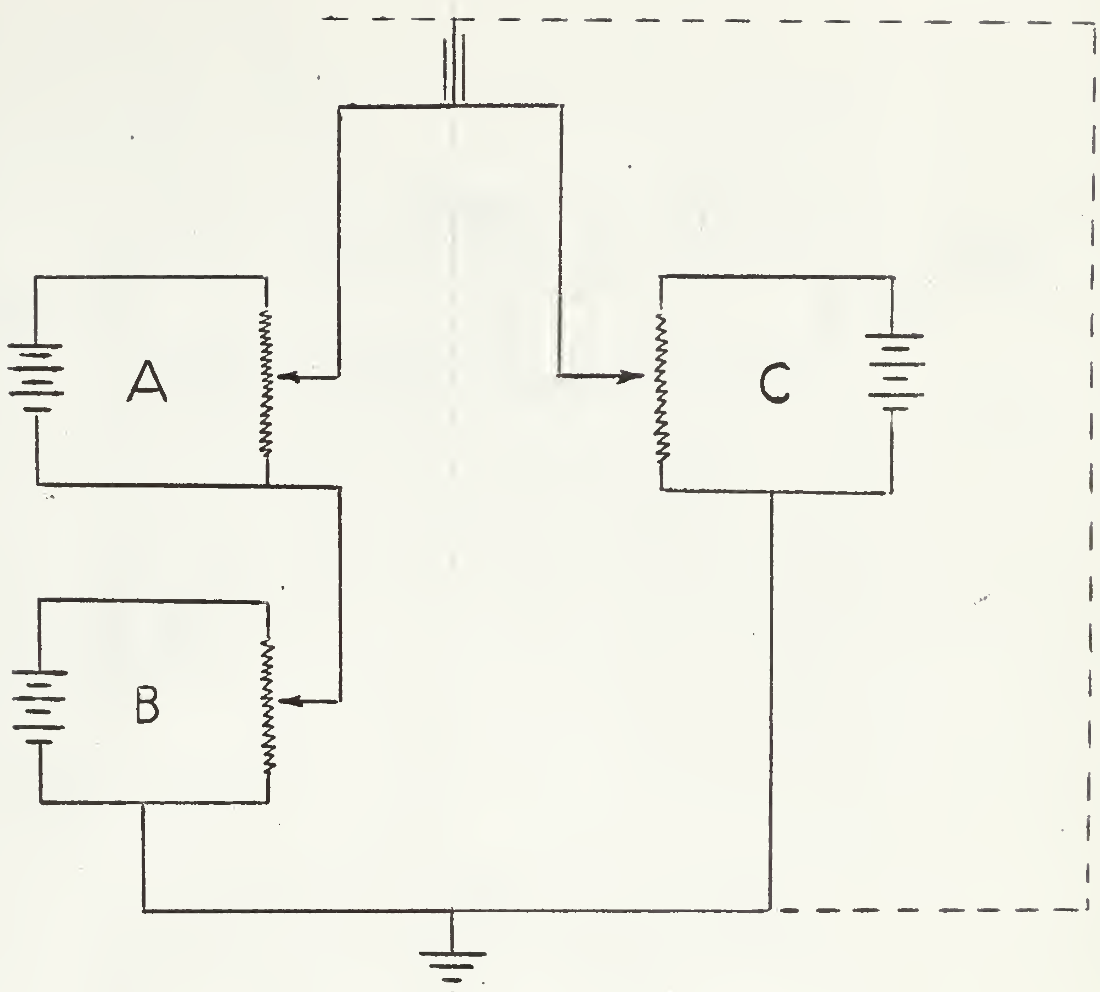


FIGURE 10

SINGLE PROBE CIRCUIT

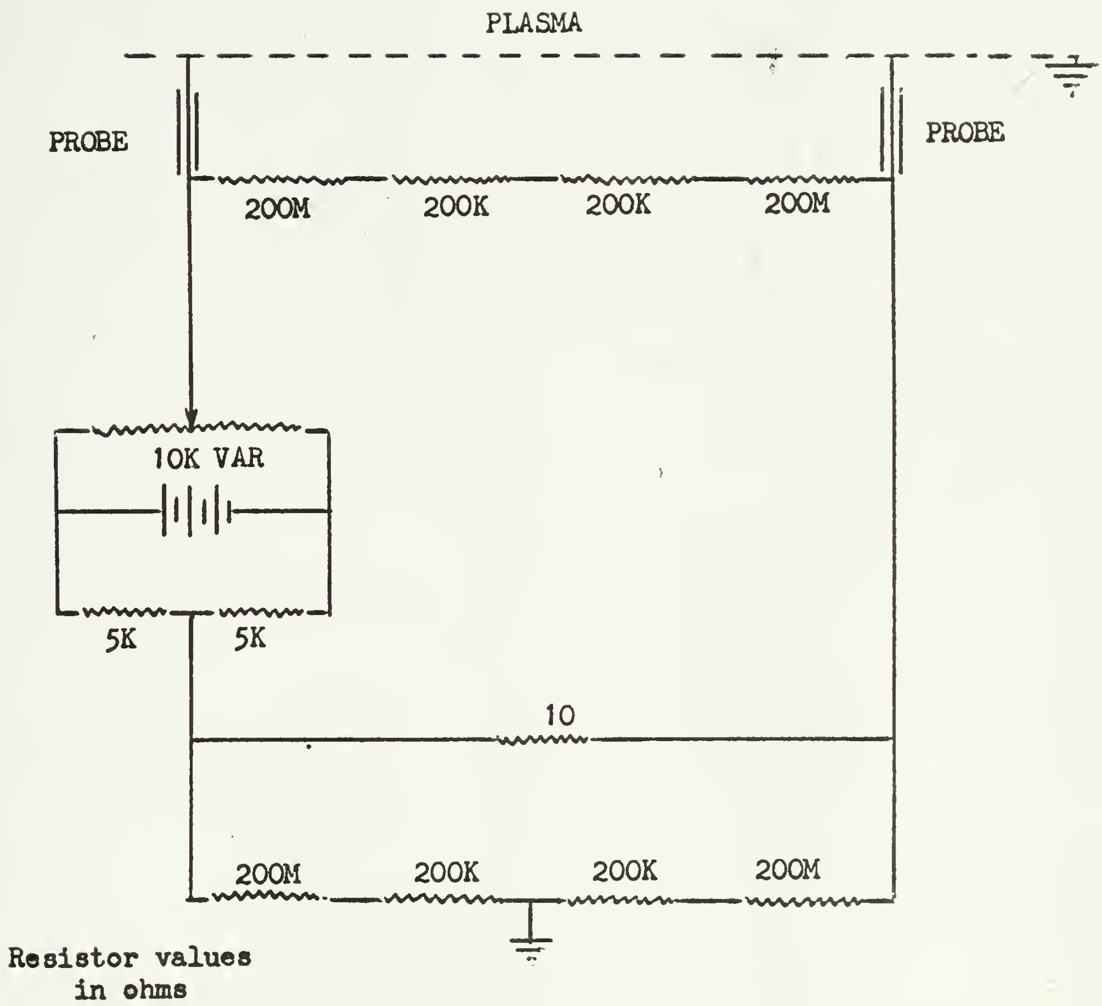


FIGURE 11

DOUBLE PROBE CIRCUIT

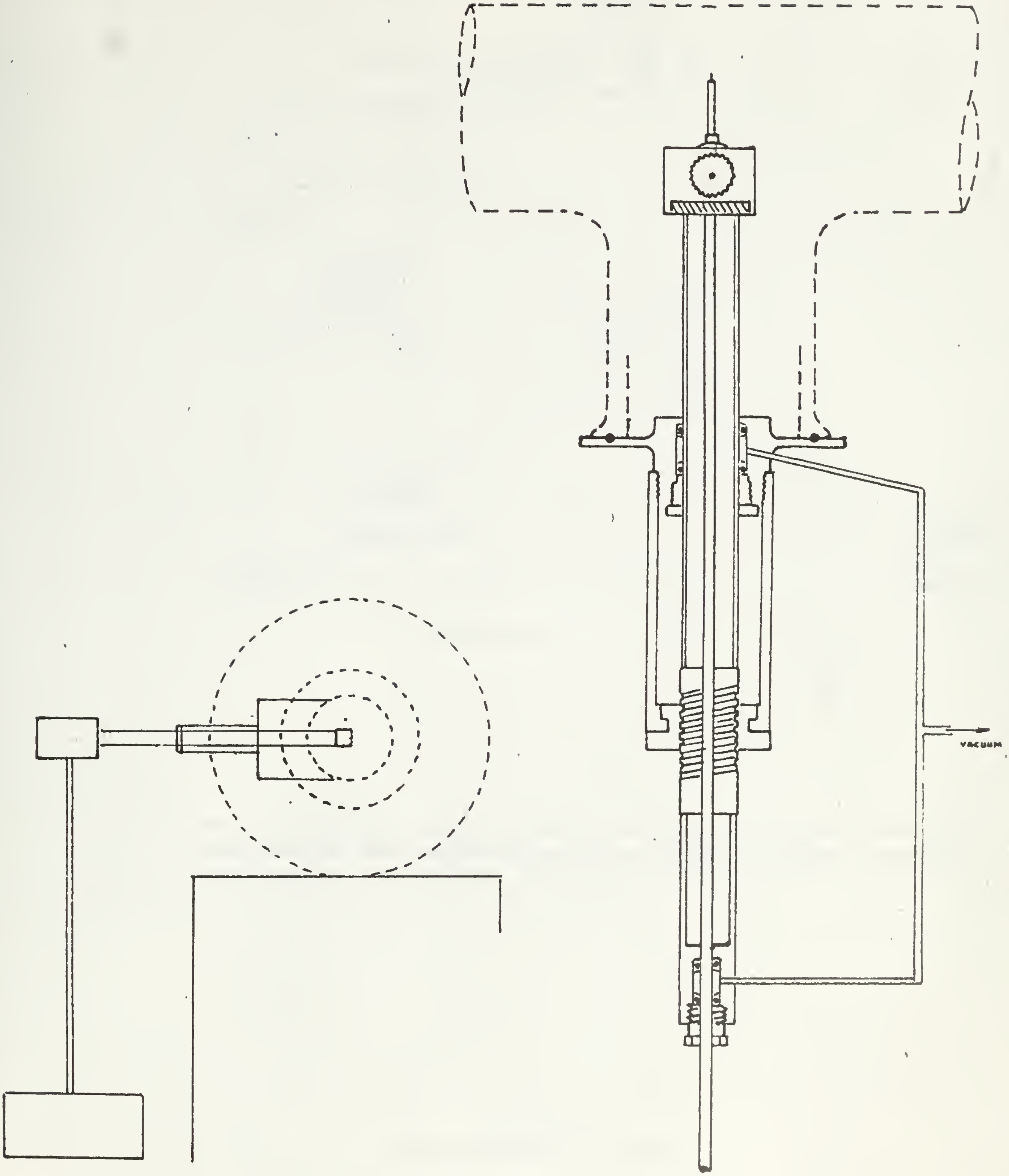
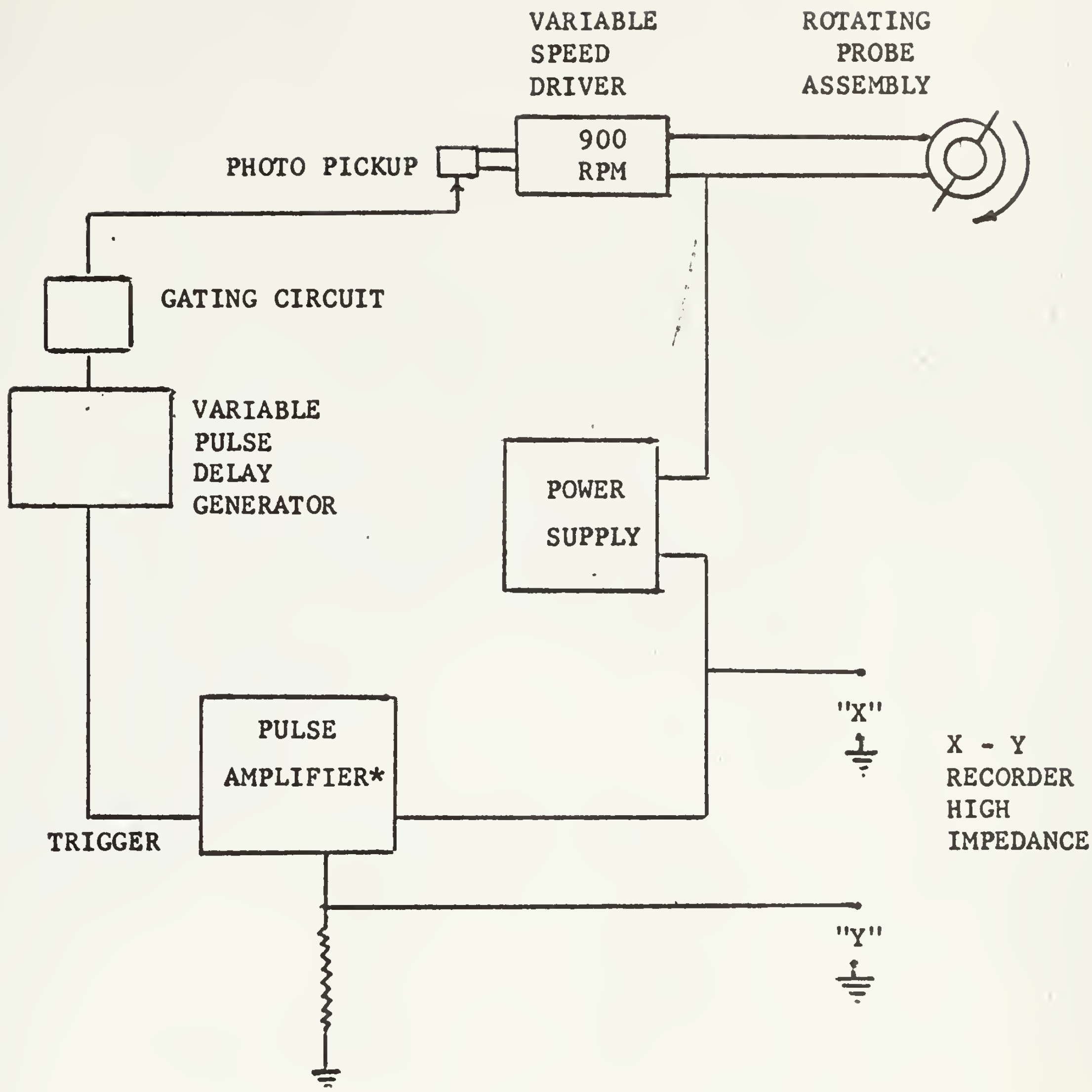


FIGURE 12
ROTATING PROBE DESIGN



* For oscilloscope output: Replace pulse amplifier with sawtooth generator of same amplitude and time characteristics. Connect terminals to X and Y axes of scope

FIGURE 13

ROTATING PROBE CIRCUITRY

FIGURE 14

EXPERIMENTAL PROBE CHARACTERISTIC CURVE

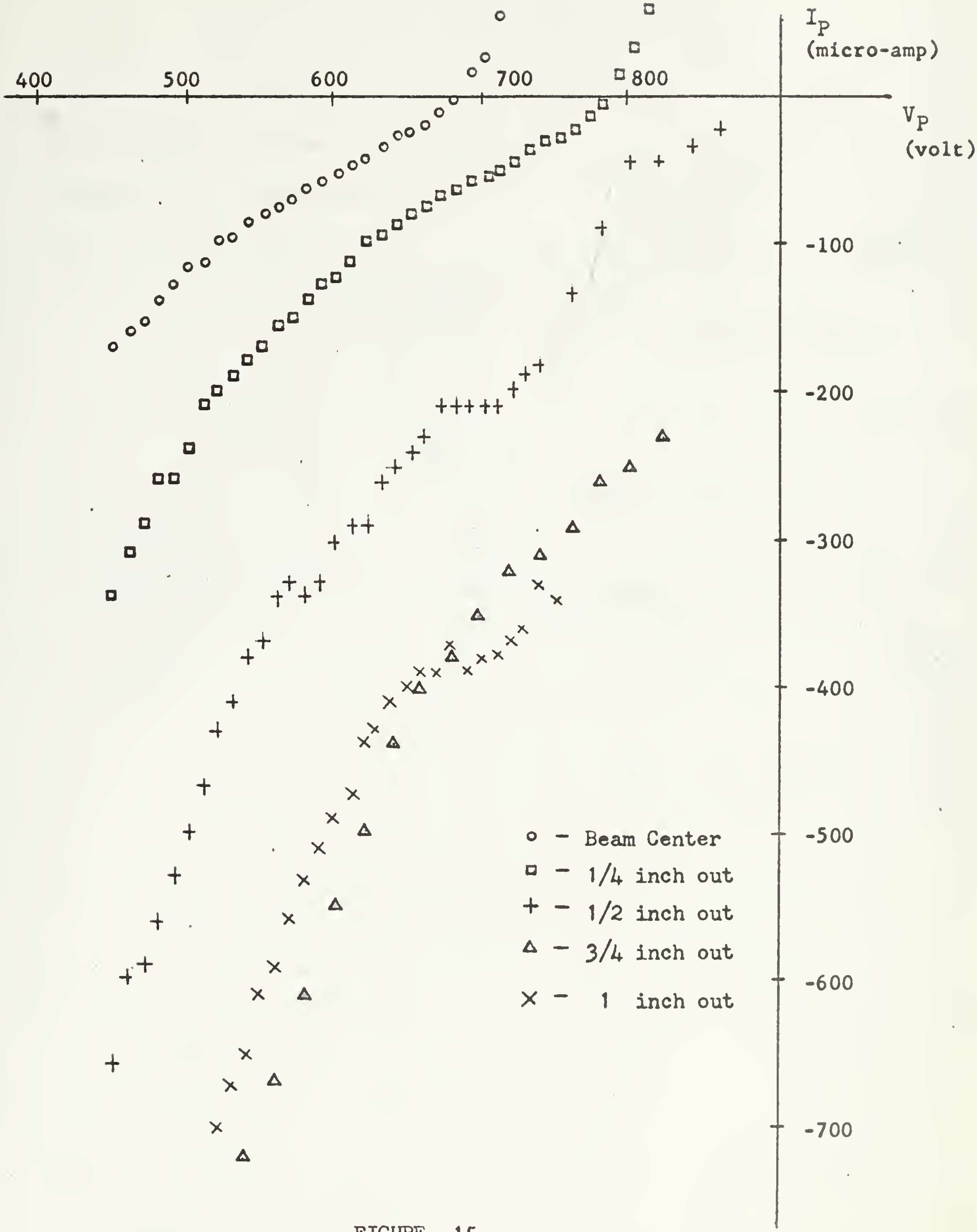


FIGURE 15

RADIAL DENSITY PLOT

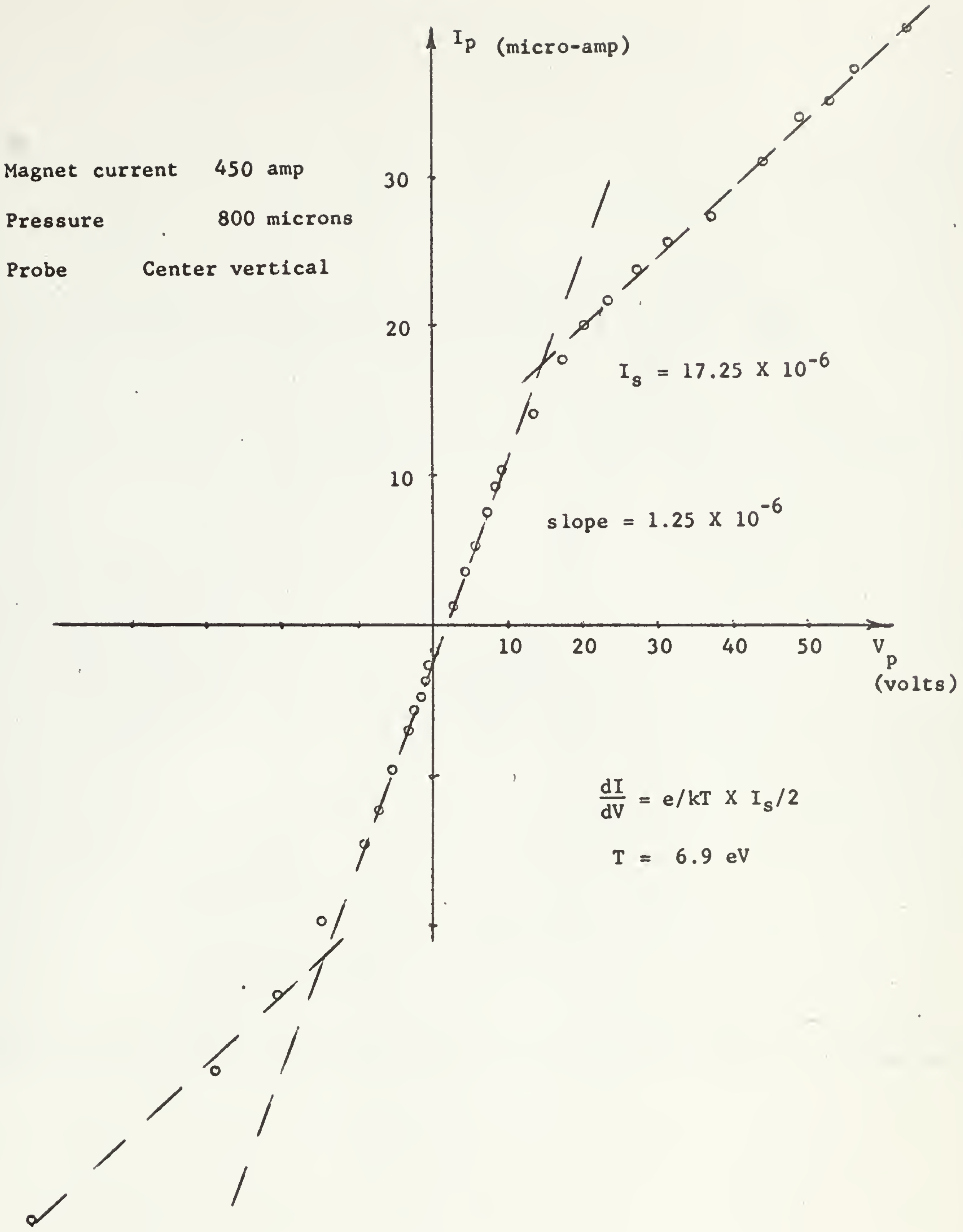


FIGURE 16

DOUBLE PROBE CHARACTERISTIC CURVE

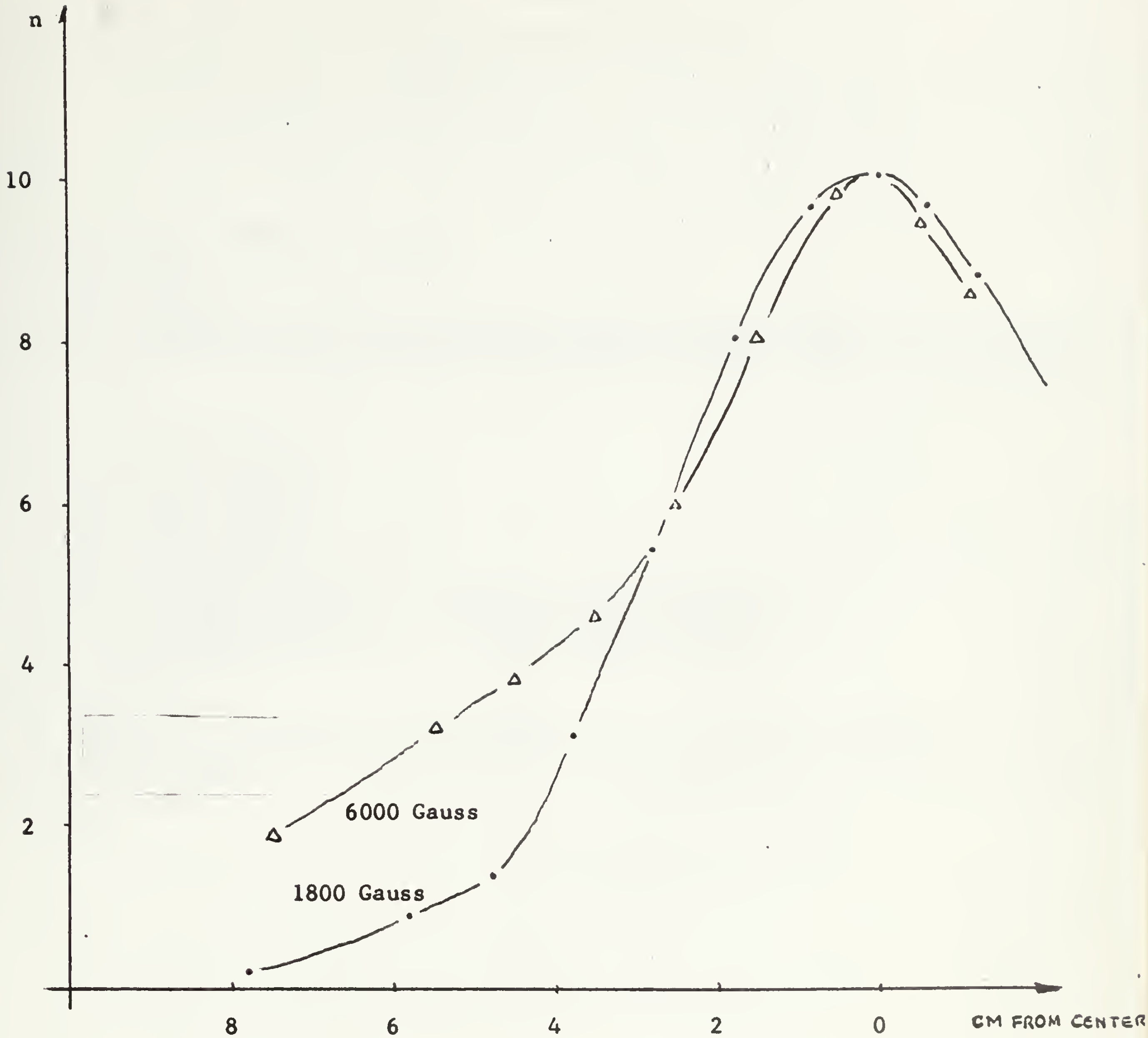
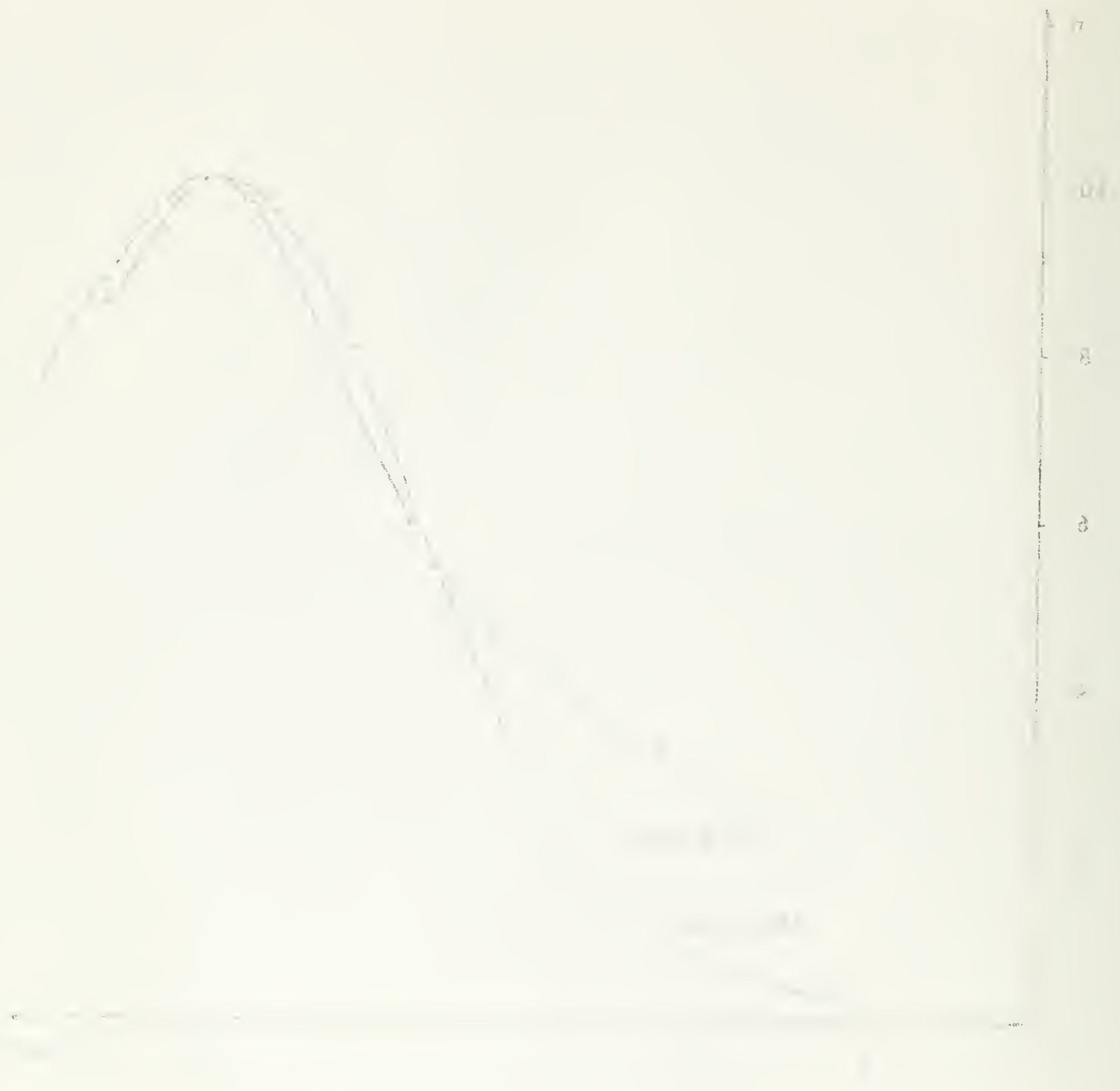


FIGURE 17

DENSITY PROFILE IN ARGON



APPENDIX A

HALL PROBE CONVERSION TABLE

```
      PROGRAM PLASMA
      DIMENSION  Y(200),  X(200)
      A = 3.00
      DO 1492  N = 1, 13
      PRINT 309
  309 FORMAT(1H1///////////4X,10HMILLIVOLTS7X,5HGAUSS6X,10HMILLIVOLTS
     17X,5HGAUSS6X,10HMILLIVOLTS7X,5HGAUSS6X,10HMILLIVOLTS7X,5HGAUSS///)
      X = A
      DO 638  I = 1, 200
      X(I) = X
      X2(I)=X(I)*X(I)
      X3(I)=X2(I)*X(I)
      X4(I)=X2(I)*X2(I)
      X5(I)=X4(I)*X(I)
      X6(I)=X3(I)*X3(I)
      X7(I)=X6(I)*X(I)
      X8(I)=X4(I)*X4(I)
      Y(I) = 1000.*(.1726432253E+01 - .1029890255E+01*X(I) +
     1.3659710339E+00*X2(I) -.5870444421E-01*X3(I) +
     2.5535395426E-02*X4(I) - .3164628725E-03*X5(I) +
     3.1076934564E-04*X6(I) - .2004806150E-06*X7(I) +
     4 .1570650213E-08*X8(I) )
      X = X + .01
  638 CONTINUE
      PRINT 639, (X(L),Y(L),X(L+50),Y(L+50),X(L+100),Y(L+100),
     1 X(L+150), Y(L+150), L = 1,50)
  639 FORMAT (4(8H          F5.2, 9H          F5.0))
      A = A + 2.00
 1492 CONTINUE
      END
      END
```

1604 COMPUTER PROGRAM

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS
3.00	724.	3.50	771.	4.00	839.	4.50	921.
3.01	725.	3.51	772.	4.01	841.	4.51	923.
3.02	726.	3.52	773.	4.02	842.	4.52	925.
3.03	726.	3.53	775.	4.03	844.	4.53	927.
3.04	727.	3.54	776.	4.04	845.	4.54	928.
3.05	728.	3.55	777.	4.05	847.	4.55	930.
3.06	729.	3.56	778.	4.06	849.	4.56	932.
3.07	729.	3.57	779.	4.07	850.	4.57	934.
3.08	730.	3.58	781.	4.08	852.	4.58	936.
3.09	731.	3.59	782.	4.09	853.	4.59	937.
3.10	732.	3.60	783.	4.10	855.	4.60	939.
3.11	732.	3.61	784.	4.11	856.	4.61	941.
3.12	733.	3.62	786.	4.12	858.	4.62	943.
3.13	734.	3.63	787.	4.13	860.	4.63	944.
3.14	735.	3.64	788.	4.14	861.	4.64	946.
3.15	736.	3.65	790.	4.15	863.	4.65	948.
3.16	736.	3.66	791.	4.16	864.	4.66	950.
3.17	737.	3.67	792.	4.17	866.	4.67	952.
3.18	738.	3.68	794.	4.18	868.	4.68	953.
3.19	739.	3.69	795.	4.19	869.	4.69	955.
3.20	740.	3.70	796.	4.20	871.	4.70	957.
3.21	741.	3.71	798.	4.21	872.	4.71	959.
3.22	742.	3.72	799.	4.22	874.	4.72	961.
3.23	743.	3.73	800.	4.23	876.	4.73	962.
3.24	743.	3.74	802.	4.24	877.	4.74	964.
3.25	744.	3.75	803.	4.25	879.	4.75	966.
3.26	745.	3.76	804.	4.26	881.	4.76	968.
3.27	746.	3.77	806.	4.27	882.	4.77	970.
3.28	747.	3.78	807.	4.28	884.	4.78	971.
3.29	748.	3.79	808.	4.29	886.	4.79	973.
3.30	749.	3.80	810.	4.30	887.	4.80	975.
3.31	750.	3.81	811.	4.31	889.	4.81	977.
3.32	751.	3.82	813.	4.32	891.	4.82	979.
3.33	752.	3.83	814.	4.33	892.	4.83	981.
3.34	753.	3.84	816.	4.34	894.	4.84	982.
3.35	754.	3.85	817.	4.35	896.	4.85	984.
3.36	755.	3.86	818.	4.36	897.	4.86	986.
3.37	756.	3.87	820.	4.37	899.	4.87	988.
3.38	757.	3.88	821.	4.38	901.	4.88	990.
3.39	759.	3.89	823.	4.39	903.	4.89	992.
3.40	760.	3.90	824.	4.40	904.	4.90	994.
3.41	761.	3.91	826.	4.41	906.	4.91	995.
3.42	762.	3.92	827.	4.42	908.	4.92	997.
3.43	763.	3.93	829.	4.43	909.	4.93	999.
3.44	764.	3.94	830.	4.44	911.	4.94	1001.
3.45	765.	3.95	832.	4.45	913.	4.95	1003.
3.46	766.	3.96	833.	4.46	915.	4.96	1005.
3.47	767.	3.97	835.	4.47	916.	4.97	1007.
3.48	769.	3.98	836.	4.48	918.	4.98	1008.
3.49	770.	3.99	838.	4.49	920.	4.99	1010.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUS
3.00	724.	3.50	771.	4.00	839.	4.50	921.
3.01	725.	3.51	772.	4.01	841.	4.51	923.
3.02	726.	3.52	773.	4.02	842.	4.52	925.
3.03	726.	3.53	775.	4.03	844.	4.53	927.
3.04	727.	3.54	776.	4.04	845.	4.54	928.
3.05	728.	3.55	777.	4.05	847.	4.55	930.
3.06	729.	3.56	778.	4.06	849.	4.56	932.
3.07	729.	3.57	779.	4.07	850.	4.57	934.
3.08	730.	3.58	781.	4.08	852.	4.58	936.
3.09	731.	3.59	782.	4.09	853.	4.59	937.
3.10	732.	3.60	783.	4.10	855.	4.60	939.
3.11	732.	3.61	784.	4.11	856.	4.61	941.
3.12	733.	3.62	786.	4.12	858.	4.62	943.
3.13	734.	3.63	787.	4.13	860.	4.63	944.
3.14	735.	3.64	788.	4.14	861.	4.64	946.
3.15	736.	3.65	790.	4.15	863.	4.65	948.
3.16	736.	3.66	791.	4.16	864.	4.66	950.
3.17	737.	3.67	792.	4.17	866.	4.67	952.
3.18	738.	3.68	794.	4.18	868.	4.68	953.
3.19	739.	3.69	795.	4.19	869.	4.69	955.
3.20	740.	3.70	796.	4.20	871.	4.70	957.
3.21	741.	3.71	798.	4.21	872.	4.71	959.
3.22	742.	3.72	799.	4.22	874.	4.72	961.
3.23	743.	3.73	800.	4.23	876.	4.73	962.
3.24	743.	3.74	802.	4.24	877.	4.74	964.
3.25	744.	3.75	803.	4.25	879.	4.75	966.
3.26	745.	3.76	804.	4.26	881.	4.76	968.
3.27	746.	3.77	806.	4.27	882.	4.77	970.
3.28	747.	3.78	807.	4.28	884.	4.78	971.
3.29	748.	3.79	808.	4.29	886.	4.79	973.
3.30	749.	3.80	810.	4.30	887.	4.80	975.
3.31	750.	3.81	811.	4.31	889.	4.81	977.
3.32	751.	3.82	813.	4.32	891.	4.82	979.
3.33	752.	3.83	814.	4.33	892.	4.83	981.
3.34	753.	3.84	816.	4.34	894.	4.84	982.
3.35	754.	3.85	817.	4.35	896.	4.85	984.
3.36	755.	3.86	818.	4.36	897.	4.86	986.
3.37	756.	3.87	820.	4.37	899.	4.87	988.
3.38	757.	3.88	821.	4.38	901.	4.88	990.
3.39	759.	3.89	823.	4.39	903.	4.89	992.
3.40	760.	3.90	824.	4.40	904.	4.90	994.
3.41	761.	3.91	826.	4.41	906.	4.91	995.
3.42	762.	3.92	827.	4.42	908.	4.92	997.
3.43	763.	3.93	829.	4.43	909.	4.93	999.
3.44	764.	3.94	830.	4.44	911.	4.94	1001.
3.45	765.	3.95	832.	4.45	913.	4.95	1003.
3.46	766.	3.96	833.	4.46	915.	4.96	1005.
3.47	767.	3.97	835.	4.47	916.	4.97	1007.
3.48	769.	3.98	836.	4.48	918.	4.98	1008.
3.49	770.	3.99	838.	4.49	920.	4.99	1010.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUS
5.00	1012.	5.50	1107.	6.00	1204.	6.50	1301.
5.01	1014.	5.51	1109.	6.01	1206.	6.51	1303.
5.02	1016.	5.52	1111.	6.02	1208.	6.52	1305.
5.03	1018.	5.53	1113.	6.03	1210.	6.53	1307.
5.04	1020.	5.54	1115.	6.04	1212.	6.54	1309.
5.05	1021.	5.55	1117.	6.05	1214.	6.55	1310.
5.06	1023.	5.56	1119.	6.06	1216.	6.56	1312.
5.07	1025.	5.57	1121.	6.07	1218.	6.57	1314.
5.08	1027.	5.58	1123.	6.08	1219.	6.58	1316.
5.09	1029.	5.59	1124.	6.09	1221.	6.59	1318.
5.10	1031.	5.60	1126.	6.10	1223.	6.60	1320.
5.11	1033.	5.61	1128.	6.11	1225.	6.61	1322.
5.12	1035.	5.62	1130.	6.12	1227.	6.62	1324.
5.13	1037.	5.63	1132.	6.13	1229.	6.63	1326.
5.14	1038.	5.64	1134.	6.14	1231.	6.64	1328.
5.15	1040.	5.65	1136.	6.15	1233.	6.65	1330.
5.16	1042.	5.66	1138.	6.16	1235.	6.66	1332.
5.17	1044.	5.67	1140.	6.17	1237.	6.67	1334.
5.18	1046.	5.68	1142.	6.18	1239.	6.68	1335.
5.19	1048.	5.69	1144.	6.19	1241.	6.69	1337.
5.20	1050.	5.70	1146.	6.20	1243.	6.70	1339.
5.21	1052.	5.71	1148.	6.21	1245.	6.71	1341.
5.22	1054.	5.72	1150.	6.22	1247.	6.72	1343.
5.23	1055.	5.73	1152.	6.23	1249.	6.73	1345.
5.24	1057.	5.74	1153.	6.24	1250.	6.74	1347.
5.25	1059.	5.75	1155.	6.25	1252.	6.75	1349.
5.26	1061.	5.76	1157.	6.26	1254.	6.76	1351.
5.27	1063.	5.77	1159.	6.27	1256.	6.77	1353.
5.28	1065.	5.78	1161.	6.28	1258.	6.78	1355.
5.29	1067.	5.79	1163.	6.29	1260.	6.79	1357.
5.30	1069.	5.80	1165.	6.30	1262.	6.80	1359.
5.31	1071.	5.81	1167.	6.31	1264.	6.81	1360.
5.32	1073.	5.82	1169.	6.32	1266.	6.82	1362.
5.33	1075.	5.83	1171.	6.33	1268.	6.83	1364.
5.34	1076.	5.84	1173.	6.34	1270.	6.84	1366.
5.35	1078.	5.85	1175.	6.35	1272.	6.85	1368.
5.36	1080.	5.86	1177.	6.36	1274.	6.86	1370.
5.37	1082.	5.87	1179.	6.37	1276.	6.87	1372.
5.38	1084.	5.88	1181.	6.38	1278.	6.88	1374.
5.39	1086.	5.89	1183.	6.39	1280.	6.89	1376.
5.40	1088.	5.90	1185.	6.40	1281.	6.90	1378.
5.41	1090.	5.91	1186.	6.41	1283.	6.91	1380.
5.42	1092.	5.92	1188.	6.42	1285.	6.92	1382.
5.43	1094.	5.93	1190.	6.43	1287.	6.93	1383.
5.44	1096.	5.94	1192.	6.44	1289.	6.94	1385.
5.45	1098.	5.95	1194.	6.45	1291.	6.95	1387.
5.46	1099.	5.96	1196.	6.46	1293.	6.96	1389.
5.47	1101.	5.97	1198.	6.47	1295.	6.97	1391.
5.48	1103.	5.98	1200.	6.48	1297.	6.98	1393.
5.49	1105.	5.99	1202.	6.49	1299.	6.99	1395.

MILLIVCLTS	GAUSS	MILLIVCLTS	GAUSS	MILLIVCLTS	GAUSS	MILLIVCLTS	GAUS
7.00	1397.	7.50	1492.	8.00	1585.	8.50	1677.
7.01	1399.	7.51	1493.	8.01	1587.	8.51	1679.
7.02	1401.	7.52	1495.	8.02	1589.	8.52	1681.
7.03	1403.	7.53	1497.	8.03	1591.	8.53	1683.
7.04	1404.	7.54	1499.	8.04	1592.	8.54	1684.
7.05	1406.	7.55	1501.	8.05	1594.	8.55	1686.
7.06	1408.	7.56	1503.	8.06	1596.	8.56	1688.
7.07	1410.	7.57	1505.	8.07	1598.	8.57	1690.
7.08	1412.	7.58	1507.	8.08	1600.	8.58	1692.
7.09	1414.	7.59	1508.	8.09	1602.	8.59	1694.
7.10	1416.	7.60	1510.	8.10	1603.	8.60	1695.
7.11	1418.	7.61	1512.	8.11	1605.	8.61	1697.
7.12	1420.	7.62	1514.	8.12	1607.	8.62	1699.
7.13	1422.	7.63	1516.	8.13	1609.	8.63	1701.
7.14	1423.	7.64	1518.	8.14	1611.	8.64	1703.
7.15	1425.	7.65	1520.	8.15	1613.	8.65	1705.
7.16	1427.	7.66	1522.	8.16	1615.	8.66	1706.
7.17	1429.	7.67	1523.	8.17	1616.	8.67	1708.
7.18	1431.	7.68	1525.	8.18	1618.	8.68	1710.
7.19	1433.	7.69	1527.	8.19	1620.	8.69	1712.
7.20	1435.	7.70	1529.	8.20	1622.	8.70	1714.
7.21	1437.	7.71	1531.	8.21	1624.	8.71	1716.
7.22	1439.	7.72	1533.	8.22	1626.	8.72	1717.
7.23	1441.	7.73	1535.	8.23	1627.	8.73	1719.
7.24	1442.	7.74	1537.	8.24	1629.	8.74	1721.
7.25	1444.	7.75	1538.	8.25	1631.	8.75	1723.
7.26	1446.	7.76	1540.	8.26	1633.	8.76	1725.
7.27	1448.	7.77	1542.	8.27	1635.	8.77	1727.
7.28	1450.	7.78	1544.	8.28	1637.	8.78	1728.
7.29	1452.	7.79	1546.	8.29	1639.	8.79	1730.
7.30	1454.	7.80	1548.	8.30	1640.	8.80	1732.
7.31	1456.	7.81	1550.	8.31	1642.	8.81	1734.
7.32	1458.	7.82	1551.	8.32	1644.	8.82	1736.
7.33	1459.	7.83	1553.	8.33	1646.	8.83	1737.
7.34	1461.	7.84	1555.	8.34	1648.	8.84	1739.
7.35	1463.	7.85	1557.	8.35	1650.	8.85	1741.
7.36	1465.	7.86	1559.	8.36	1651.	8.86	1743.
7.37	1467.	7.87	1561.	8.37	1653.	8.87	1745.
7.38	1469.	7.88	1563.	8.38	1655.	8.88	1747.
7.39	1471.	7.89	1564.	8.39	1657.	8.89	1748.
7.40	1473.	7.90	1566.	8.40	1659.	8.90	1750.
7.41	1475.	7.91	1568.	8.41	1661.	8.91	1752.
7.42	1476.	7.92	1570.	8.42	1662.	8.92	1754.
7.43	1478.	7.93	1572.	8.43	1664.	8.93	1756.
7.44	1480.	7.94	1574.	8.44	1666.	8.94	1758.
7.45	1482.	7.95	1576.	8.45	1668.	8.95	1759.
7.46	1484.	7.96	1578.	8.46	1670.	8.96	1761.
7.47	1486.	7.97	1579.	8.47	1672.	8.97	1763.
7.48	1488.	7.98	1581.	8.48	1673.	8.98	1765.
7.49	1490.	7.99	1583.	8.49	1675.	8.99	1767.

MILLIVCLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVCLTS	GAUSS	MILLIVCLTS	GAUS
9.00	1768.	9.50	1859.	10.00	1949.	10.50	2040.
9.01	1770.	9.51	1861.	10.01	1951.	10.51	2042.
9.02	1772.	9.52	1863.	10.02	1953.	10.52	2043.
9.03	1774.	9.53	1865.	10.03	1955.	10.53	2045.
9.04	1776.	9.54	1866.	10.04	1957.	10.54	2047.
9.05	1778.	9.55	1868.	10.05	1958.	10.55	2049.
9.06	1779.	9.56	1870.	10.06	1960.	10.56	2051.
9.07	1781.	9.57	1872.	10.07	1962.	10.57	2052.
9.08	1783.	9.58	1874.	10.08	1964.	10.58	2054.
9.09	1785.	9.59	1875.	10.09	1966.	10.59	2056.
9.10	1787.	9.60	1877.	10.10	1968.	10.60	2058.
9.11	1788.	9.61	1879.	10.11	1969.	10.61	2060.
9.12	1790.	9.62	1881.	10.12	1971.	10.62	2061.
9.13	1792.	9.63	1883.	10.13	1973.	10.63	2063.
9.14	1794.	9.64	1884.	10.14	1975.	10.64	2065.
9.15	1796.	9.65	1886.	10.15	1977.	10.65	2067.
9.16	1798.	9.66	1888.	10.16	1978.	10.66	2069.
9.17	1799.	9.67	1890.	10.17	1980.	10.67	2070.
9.18	1801.	9.68	1892.	10.18	1982.	10.68	2072.
9.19	1803.	9.69	1893.	10.19	1984.	10.69	2074.
9.20	1805.	9.70	1895.	10.20	1986.	10.70	2076.
9.21	1807.	9.71	1897.	10.21	1987.	10.71	2078.
9.22	1808.	9.72	1899.	10.22	1989.	10.72	2079.
9.23	1810.	9.73	1901.	10.23	1991.	10.73	2081.
9.24	1812.	9.74	1903.	10.24	1993.	10.74	2083.
9.25	1814.	9.75	1904.	10.25	1995.	10.75	2085.
9.26	1816.	9.76	1906.	10.26	1996.	10.76	2087.
9.27	1817.	9.77	1908.	10.27	1998.	10.77	2088.
9.28	1819.	9.78	1910.	10.28	2000.	10.78	2090.
9.29	1821.	9.79	1912.	10.29	2002.	10.79	2092.
9.30	1823.	9.80	1913.	10.30	2004.	10.80	2094.
9.31	1825.	9.81	1915.	10.31	2005.	10.81	2096.
9.32	1827.	9.82	1917.	10.32	2007.	10.82	2097.
9.33	1828.	9.83	1919.	10.33	2009.	10.83	2099.
9.34	1830.	9.84	1921.	10.34	2011.	10.84	2101.
9.35	1832.	9.85	1922.	10.35	2013.	10.85	2103.
9.36	1834.	9.86	1924.	10.36	2014.	10.86	2105.
9.37	1836.	9.87	1926.	10.37	2016.	10.87	2107.
9.38	1837.	9.88	1928.	10.38	2018.	10.88	2108.
9.39	1839.	9.89	1930.	10.39	2020.	10.89	2110.
9.40	1841.	9.90	1931.	10.40	2022.	10.90	2112.
9.41	1843.	9.91	1933.	10.41	2023.	10.91	2114.
9.42	1845.	9.92	1935.	10.42	2025.	10.92	2116.
9.43	1846.	9.93	1937.	10.43	2027.	10.93	2117.
9.44	1848.	9.94	1939.	10.44	2029.	10.94	2119.
9.45	1850.	9.95	1940.	10.45	2031.	10.95	2121.
9.46	1852.	9.96	1942.	10.46	2032.	10.96	2123.
9.47	1854.	9.97	1944.	10.47	2034.	10.97	2125.
9.48	1855.	9.98	1946.	10.48	2036.	10.98	2126.
9.49	1857.	9.99	1948.	10.49	2038.	10.99	2128.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS
11.00	2130.	11.50	2220.	12.00	2311.	12.50	2402.
11.01	2132.	11.51	2222.	12.01	2313.	12.51	2403.
11.02	2134.	11.52	2224.	12.02	2315.	12.52	2405.
11.03	2135.	11.53	2226.	12.03	2316.	12.53	2407.
11.04	2137.	11.54	2228.	12.04	2318.	12.54	2409.
11.05	2139.	11.55	2230.	12.05	2320.	12.55	2411.
11.06	2141.	11.56	2231.	12.06	2322.	12.56	2413.
11.07	2143.	11.57	2233.	12.07	2324.	12.57	2414.
11.08	2144.	11.58	2235.	12.08	2326.	12.58	2416.
11.09	2146.	11.59	2237.	12.09	2327.	12.59	2418.
11.10	2148.	11.60	2239.	12.10	2329.	12.60	2420.
11.11	2150.	11.61	2240.	12.11	2331.	12.61	2422.
11.12	2152.	11.62	2242.	12.12	2333.	12.62	2423.
11.13	2154.	11.63	2244.	12.13	2335.	12.63	2425.
11.14	2155.	11.64	2246.	12.14	2336.	12.64	2427.
11.15	2157.	11.65	2248.	12.15	2338.	12.65	2429.
11.16	2159.	11.66	2249.	12.16	2340.	12.66	2431.
11.17	2161.	11.67	2251.	12.17	2342.	12.67	2432.
11.18	2163.	11.68	2253.	12.18	2344.	12.68	2434.
11.19	2164.	11.69	2255.	12.19	2345.	12.69	2436.
11.20	2166.	11.70	2257.	12.20	2347.	12.70	2438.
11.21	2168.	11.71	2258.	12.21	2349.	12.71	2440.
11.22	2170.	11.72	2260.	12.22	2351.	12.72	2442.
11.23	2172.	11.73	2262.	12.23	2353.	12.73	2443.
11.24	2173.	11.74	2264.	12.24	2355.	12.74	2445.
11.25	2175.	11.75	2266.	12.25	2356.	12.75	2447.
11.26	2177.	11.76	2268.	12.26	2358.	12.76	2449.
11.27	2179.	11.77	2269.	12.27	2360.	12.77	2451.
11.28	2181.	11.78	2271.	12.28	2362.	12.78	2452.
11.29	2182.	11.79	2273.	12.29	2364.	12.79	2454.
11.30	2184.	11.80	2275.	12.30	2365.	12.80	2456.
11.31	2186.	11.81	2277.	12.31	2367.	12.81	2458.
11.32	2188.	11.82	2278.	12.32	2369.	12.82	2460.
11.33	2190.	11.83	2280.	12.33	2371.	12.83	2461.
11.34	2192.	11.84	2282.	12.34	2373.	12.84	2463.
11.35	2193.	11.85	2284.	12.35	2374.	12.85	2465.
11.36	2195.	11.86	2286.	12.36	2376.	12.86	2467.
11.37	2197.	11.87	2287.	12.37	2378.	12.87	2469.
11.38	2199.	11.88	2289.	12.38	2380.	12.88	2470.
11.39	2201.	11.89	2291.	12.39	2382.	12.89	2472.
11.40	2202.	11.90	2293.	12.40	2384.	12.90	2474.
11.41	2204.	11.91	2295.	12.41	2385.	12.91	2476.
11.42	2206.	11.92	2297.	12.42	2387.	12.92	2478.
11.43	2208.	11.93	2298.	12.43	2389.	12.93	2480.
11.44	2210.	11.94	2300.	12.44	2391.	12.94	2481.
11.45	2211.	11.95	2302.	12.45	2393.	12.95	2483.
11.46	2213.	11.96	2304.	12.46	2394.	12.96	2485.
11.47	2215.	11.97	2306.	12.47	2396.	12.97	2487.
11.48	2217.	11.98	2307.	12.48	2398.	12.98	2489.
11.49	2219.	11.99	2309.	12.49	2400.	12.99	2490.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUS
13.00	2492.	13.50	2583.	14.00	2672.	14.50	2762.
13.01	2494.	13.51	2584.	14.01	2674.	14.51	2764.
13.02	2496.	13.52	2586.	14.02	2676.	14.52	2765.
13.03	2498.	13.53	2588.	14.03	2678.	14.53	2767.
13.04	2499.	13.54	2590.	14.04	2680.	14.54	2769.
13.05	2501.	13.55	2592.	14.05	2681.	14.55	2771.
13.06	2503.	13.56	2593.	14.06	2683.	14.56	2773.
13.07	2505.	13.57	2595.	14.07	2685.	14.57	2774.
13.08	2507.	13.58	2597.	14.08	2687.	14.58	2776.
13.09	2509.	13.59	2599.	14.09	2689.	14.59	2778.
13.10	2510.	13.60	2601.	14.10	2690.	14.60	2780.
13.11	2512.	13.61	2602.	14.11	2692.	14.61	2781.
13.12	2514.	13.62	2604.	14.12	2694.	14.62	2783.
13.13	2516.	13.63	2606.	14.13	2696.	14.63	2785.
13.14	2518.	13.64	2608.	14.14	2698.	14.64	2787.
13.15	2519.	13.65	2610.	14.15	2699.	14.65	2788.
13.16	2521.	13.66	2611.	14.16	2701.	14.66	2790.
13.17	2523.	13.67	2613.	14.17	2703.	14.67	2792.
13.18	2525.	13.68	2615.	14.18	2705.	14.68	2794.
13.19	2527.	13.69	2617.	14.19	2707.	14.69	2796.
13.20	2528.	13.70	2619.	14.20	2708.	14.70	2797.
13.21	2530.	13.71	2620.	14.21	2710.	14.71	2799.
13.22	2532.	13.72	2622.	14.22	2712.	14.72	2801.
13.23	2534.	13.73	2624.	14.23	2714.	14.73	2803.
13.24	2536.	13.74	2626.	14.24	2715.	14.74	2804.
13.25	2537.	13.75	2628.	14.25	2717.	14.75	2806.
13.26	2539.	13.76	2629.	14.26	2719.	14.76	2808.
13.27	2541.	13.77	2631.	14.27	2721.	14.77	2810.
13.28	2543.	13.78	2633.	14.28	2723.	14.78	2812.
13.29	2545.	13.79	2635.	14.29	2724.	14.79	2813.
13.30	2546.	13.80	2637.	14.30	2726.	14.80	2815.
13.31	2548.	13.81	2638.	14.31	2728.	14.81	2817.
13.32	2550.	13.82	2640.	14.32	2730.	14.82	2819.
13.33	2552.	13.83	2642.	14.33	2732.	14.83	2820.
13.34	2554.	13.84	2644.	14.34	2733.	14.84	2822.
13.35	2555.	13.85	2646.	14.35	2735.	14.85	2824.
13.36	2557.	13.86	2647.	14.36	2737.	14.86	2826.
13.37	2559.	13.87	2649.	14.37	2739.	14.87	2827.
13.38	2561.	13.88	2651.	14.38	2740.	14.88	2829.
13.39	2563.	13.89	2653.	14.39	2742.	14.89	2831.
13.40	2565.	13.90	2655.	14.40	2744.	14.90	2833.
13.41	2566.	13.91	2656.	14.41	2746.	14.91	2835.
13.42	2568.	13.92	2658.	14.42	2748.	14.92	2836.
13.43	2570.	13.93	2660.	14.43	2749.	14.93	2838.
13.44	2572.	13.94	2662.	14.44	2751.	14.94	2840.
13.45	2574.	13.95	2664.	14.45	2753.	14.95	2842.
13.46	2575.	13.96	2665.	14.46	2755.	14.96	2843.
13.47	2577.	13.97	2667.	14.47	2756.	14.97	2845.
13.48	2579.	13.98	2669.	14.48	2758.	14.98	2847.
13.49	2581.	13.99	2671.	14.49	2760.	14.99	2849.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS
15.00	2850.	15.50	2938.	16.00	3025.	16.50	3111.
15.01	2852.	15.51	2940.	16.01	3027.	16.51	3113.
15.02	2854.	15.52	2942.	16.02	3029.	16.52	3114.
15.03	2856.	15.53	2943.	16.03	3030.	16.53	3116.
15.04	2858.	15.54	2945.	16.04	3032.	16.54	3118.
15.05	2859.	15.55	2947.	16.05	3034.	16.55	3120.
15.06	2861.	15.56	2949.	16.06	3035.	16.56	3121.
15.07	2863.	15.57	2950.	16.07	3037.	16.57	3123.
15.08	2865.	15.58	2952.	16.08	3039.	16.58	3125.
15.09	2866.	15.59	2954.	16.09	3041.	16.59	3126.
15.10	2868.	15.60	2956.	16.10	3042.	16.60	3128.
15.11	2870.	15.61	2957.	16.11	3044.	16.61	3130.
15.12	2872.	15.62	2959.	16.12	3046.	16.62	3132.
15.13	2873.	15.63	2961.	16.13	3048.	16.63	3133.
15.14	2875.	15.64	2963.	16.14	3049.	16.64	3135.
15.15	2877.	15.65	2964.	16.15	3051.	16.65	3137.
15.16	2879.	15.66	2966.	16.16	3053.	16.66	3138.
15.17	2880.	15.67	2968.	16.17	3054.	16.67	3140.
15.18	2882.	15.68	2970.	16.18	3056.	16.68	3142.
15.19	2884.	15.69	2971.	16.19	3058.	16.69	3143.
15.20	2886.	15.70	2973.	16.20	3060.	16.70	3145.
15.21	2887.	15.71	2975.	16.21	3061.	16.71	3147.
15.22	2889.	15.72	2977.	16.22	3063.	16.72	3149.
15.23	2891.	15.73	2978.	16.23	3065.	16.73	3150.
15.24	2893.	15.74	2980.	16.24	3066.	16.74	3152.
15.25	2894.	15.75	2982.	16.25	3068.	16.75	3154.
15.26	2896.	15.76	2984.	16.26	3070.	16.76	3155.
15.27	2898.	15.77	2985.	16.27	3072.	16.77	3157.
15.28	2900.	15.78	2987.	16.28	3073.	16.78	3159.
15.29	2901.	15.79	2989.	16.29	3075.	16.79	3160.
15.30	2903.	15.80	2990.	16.30	3077.	16.80	3162.
15.31	2905.	15.81	2992.	16.31	3078.	16.81	3164.
15.32	2907.	15.82	2994.	16.32	3080.	16.82	3166.
15.33	2908.	15.83	2996.	16.33	3082.	16.83	3167.
15.34	2910.	15.84	2997.	16.34	3084.	16.84	3169.
15.35	2912.	15.85	2999.	16.35	3085.	16.85	3171.
15.36	2914.	15.86	3001.	16.36	3087.	16.86	3172.
15.37	2915.	15.87	3003.	16.37	3089.	16.87	3174.
15.38	2917.	15.88	3004.	16.38	3090.	16.88	3176.
15.39	2919.	15.89	3006.	16.39	3092.	16.89	3177.
15.40	2921.	15.90	3008.	16.40	3094.	16.90	3179.
15.41	2922.	15.91	3010.	16.41	3096.	16.91	3181.
15.42	2924.	15.92	3011.	16.42	3097.	16.92	3183.
15.43	2926.	15.93	3013.	16.43	3099.	16.93	3184.
15.44	2928.	15.94	3015.	16.44	3101.	16.94	3186.
15.45	2929.	15.95	3016.	16.45	3102.	16.95	3188.
15.46	2931.	15.96	3018.	16.46	3104.	16.96	3189.
15.47	2933.	15.97	3020.	16.47	3106.	16.97	3191.
15.48	2935.	15.98	3022.	16.48	3108.	16.98	3193.
15.49	2936.	15.99	3023.	16.49	3109.	16.99	3194.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS
17.00	3196.	17.50	3280.	18.00	3364.	18.50	3447.
17.01	3198.	17.51	3282.	18.01	3366.	18.51	3449.
17.02	3199.	17.52	3284.	18.02	3367.	18.52	3450.
17.03	3201.	17.53	3285.	18.03	3369.	18.53	3452.
17.04	3203.	17.54	3287.	18.04	3371.	18.54	3454.
17.05	3205.	17.55	3289.	18.05	3372.	18.55	3455.
17.06	3206.	17.56	3290.	18.06	3374.	18.56	3457.
17.07	3208.	17.57	3292.	18.07	3376.	18.57	3459.
17.08	3210.	17.58	3294.	18.08	3377.	18.58	3460.
17.09	3211.	17.59	3295.	18.09	3379.	18.59	3462.
17.10	3213.	17.60	3297.	18.10	3381.	18.60	3464.
17.11	3215.	17.61	3299.	18.11	3382.	18.61	3465.
17.12	3216.	17.62	3300.	18.12	3384.	18.62	3467.
17.13	3218.	17.63	3302.	18.13	3386.	18.63	3469.
17.14	3220.	17.64	3304.	18.14	3387.	18.64	3470.
17.15	3221.	17.65	3305.	18.15	3389.	18.65	3472.
17.16	3223.	17.66	3307.	18.16	3391.	18.66	3474.
17.17	3225.	17.67	3309.	18.17	3392.	18.67	3475.
17.18	3226.	17.68	3310.	18.18	3394.	18.68	3477.
17.19	3228.	17.69	3312.	18.19	3396.	18.69	3478.
17.20	3230.	17.70	3314.	18.20	3397.	18.70	3480.
17.21	3232.	17.71	3316.	18.21	3399.	18.71	3482.
17.22	3233.	17.72	3317.	18.22	3401.	18.72	3483.
17.23	3235.	17.73	3319.	18.23	3402.	18.73	3485.
17.24	3237.	17.74	3321.	18.24	3404.	18.74	3487.
17.25	3238.	17.75	3322.	18.25	3406.	18.75	3488.
17.26	3240.	17.76	3324.	18.26	3407.	18.76	3490.
17.27	3242.	17.77	3326.	18.27	3409.	18.77	3492.
17.28	3243.	17.78	3327.	18.28	3410.	18.78	3493.
17.29	3245.	17.79	3329.	18.29	3412.	18.79	3495.
17.30	3247.	17.80	3331.	18.30	3414.	18.80	3497.
17.31	3248.	17.81	3332.	18.31	3415.	18.81	3498.
17.32	3250.	17.82	3334.	18.32	3417.	18.82	3500.
17.33	3252.	17.83	3336.	18.33	3419.	18.83	3502.
17.34	3253.	17.84	3337.	18.34	3420.	18.84	3503.
17.35	3255.	17.85	3339.	18.35	3422.	18.85	3505.
17.36	3257.	17.86	3341.	18.36	3424.	18.86	3507.
17.37	3258.	17.87	3342.	18.37	3425.	18.87	3508.
17.38	3260.	17.88	3344.	18.38	3427.	18.88	3510.
17.39	3262.	17.89	3346.	18.39	3429.	18.89	3512.
17.40	3264.	17.90	3347.	18.40	3430.	18.90	3513.
17.41	3265.	17.91	3349.	18.41	3432.	18.91	3515.
17.42	3267.	17.92	3351.	18.42	3434.	18.92	3517.
17.43	3269.	17.93	3352.	18.43	3435.	18.93	3518.
17.44	3270.	17.94	3354.	18.44	3437.	18.94	3520.
17.45	3272.	17.95	3356.	18.45	3439.	18.95	3522.
17.46	3274.	17.96	3357.	18.46	3440.	18.96	3523.
17.47	3275.	17.97	3359.	18.47	3442.	18.97	3525.
17.48	3277.	17.98	3361.	18.48	3444.	18.98	3526.
17.49	3279.	17.99	3362.	18.49	3445.	18.99	3528.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS
19.00	3530.	19.50	3612.	20.00	3695.	20.50	3778.
19.01	3531.	19.51	3614.	20.01	3697.	20.51	3780.
19.02	3533.	19.52	3616.	20.02	3698.	20.52	3781.
19.03	3535.	19.53	3617.	20.03	3700.	20.53	3783.
19.04	3536.	19.54	3619.	20.04	3702.	20.54	3785.
19.05	3538.	19.55	3621.	20.05	3703.	20.55	3786.
19.06	3540.	19.56	3622.	20.06	3705.	20.56	3788.
19.07	3541.	19.57	3624.	20.07	3707.	20.57	3790.
19.08	3543.	19.58	3626.	20.08	3708.	20.58	3791.
19.09	3545.	19.59	3627.	20.09	3710.	20.59	3793.
19.10	3546.	19.60	3629.	20.10	3712.	20.60	3795.
19.11	3548.	19.61	3631.	20.11	3713.	20.61	3796.
19.12	3550.	19.62	3632.	20.12	3715.	20.62	3798.
19.13	3551.	19.63	3634.	20.13	3717.	20.63	3800.
19.14	3553.	19.64	3636.	20.14	3718.	20.64	3801.
19.15	3555.	19.65	3637.	20.15	3720.	20.65	3803.
19.16	3556.	19.66	3639.	20.16	3722.	20.66	3805.
19.17	3558.	19.67	3641.	20.17	3723.	20.67	3806.
19.18	3560.	19.68	3642.	20.18	3725.	20.68	3808.
19.19	3561.	19.69	3644.	20.19	3727.	20.69	3810.
19.20	3563.	19.70	3646.	20.20	3728.	20.70	3811.
19.21	3564.	19.71	3647.	20.21	3730.	20.71	3813.
19.22	3566.	19.72	3649.	20.22	3732.	20.72	3815.
19.23	3568.	19.73	3650.	20.23	3733.	20.73	3816.
19.24	3569.	19.74	3652.	20.24	3735.	20.74	3818.
19.25	3571.	19.75	3654.	20.25	3737.	20.75	3820.
19.26	3573.	19.76	3655.	20.26	3738.	20.76	3821.
19.27	3574.	19.77	3657.	20.27	3740.	20.77	3823.
19.28	3576.	19.78	3659.	20.28	3742.	20.78	3825.
19.29	3578.	19.79	3660.	20.29	3743.	20.79	3826.
19.30	3579.	19.80	3662.	20.30	3745.	20.80	3828.
19.31	3581.	19.81	3664.	20.31	3747.	20.81	3830.
19.32	3583.	19.82	3665.	20.32	3748.	20.82	3831.
19.33	3584.	19.83	3667.	20.33	3750.	20.83	3833.
19.34	3586.	19.84	3669.	20.34	3751.	20.84	3835.
19.35	3588.	19.85	3670.	20.35	3753.	20.85	3836.
19.36	3589.	19.86	3672.	20.36	3755.	20.86	3838.
19.37	3591.	19.87	3674.	20.37	3756.	20.87	3840.
19.38	3593.	19.88	3675.	20.38	3758.	20.88	3841.
19.39	3594.	19.89	3677.	20.39	3760.	20.89	3843.
19.40	3596.	19.90	3679.	20.40	3761.	20.90	3845.
19.41	3598.	19.91	3680.	20.41	3763.	20.91	3846.
19.42	3599.	19.92	3682.	20.42	3765.	20.92	3848.
19.43	3601.	19.93	3684.	20.43	3766.	20.93	3849.
19.44	3603.	19.94	3685.	20.44	3768.	20.94	3851.
19.45	3604.	19.95	3687.	20.45	3770.	20.95	3853.
19.46	3606.	19.96	3689.	20.46	3771.	20.96	3854.
19.47	3607.	19.97	3690.	20.47	3773.	20.97	3856.
19.48	3609.	19.98	3692.	20.48	3775.	20.98	3858.
19.49	3611.	19.99	3693.	20.49	3776.	20.99	3859.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVCLTS	GAUSS	MILLIVOLTS	GAUSS
21.00	3861.	21.50	3945.	22.00	4C28.	22.50	4112.
21.01	3863.	21.51	3946.	22.01	4C30.	22.51	4113.
21.02	3864.	21.52	3948.	22.02	4C31.	22.52	4115.
21.03	3866.	21.53	3950.	22.03	4C33.	22.53	4117.
21.04	3868.	21.54	3951.	22.04	4035.	22.54	4118.
21.05	3869.	21.55	3953.	22.05	4C36.	22.55	4120.
21.06	3871.	21.56	3955.	22.06	4C38.	22.56	4122.
21.07	3873.	21.57	3956.	22.07	4C40.	22.57	4123.
21.08	3874.	21.58	3958.	22.08	4041.	22.58	4125.
21.09	3876.	21.59	3960.	22.09	4043.	22.59	4127.
21.10	3878.	21.60	3961.	22.10	4C45.	22.60	4128.
21.11	3879.	21.61	3963.	22.11	4C46.	22.61	4130.
21.12	3881.	21.62	3965.	22.12	4C48.	22.62	4132.
21.13	3883.	21.63	3966.	22.13	4C50.	22.63	4133.
21.14	3884.	21.64	3968.	22.14	4C51.	22.64	4135.
21.15	3886.	21.65	3970.	22.15	4C53.	22.65	4137.
21.16	3888.	21.66	3971.	22.16	4055.	22.66	4138.
21.17	3889.	21.67	3973.	22.17	4C57.	22.67	4140.
21.18	3891.	21.68	3975.	22.18	4C58.	22.68	4142.
21.19	3893.	21.69	3976.	22.19	4060.	22.69	4143.
21.20	3894.	21.70	3978.	22.20	4C62.	22.70	4145.
21.21	3896.	21.71	3980.	22.21	4C63.	22.71	4147.
21.22	3898.	21.72	3981.	22.22	4C65.	22.72	4148.
21.23	3899.	21.73	3983.	22.23	4067.	22.73	4150.
21.24	3901.	21.74	3985.	22.24	4068.	22.74	4152.
21.25	3903.	21.75	3986.	22.25	4070.	22.75	4153.
21.26	3904.	21.76	3988.	22.26	4C72.	22.76	4155.
21.27	3906.	21.77	3990.	22.27	4073.	22.77	4157.
21.28	3908.	21.78	3991.	22.28	4075.	22.78	4158.
21.29	3909.	21.79	3993.	22.29	4C77.	22.79	4160.
21.30	3911.	21.80	3995.	22.30	4C78.	22.80	4162.
21.31	3913.	21.81	3996.	22.31	4080.	22.81	4163.
21.32	3914.	21.82	3998.	22.32	4082.	22.82	4165.
21.33	3916.	21.83	4000.	22.33	4C83.	22.83	4167.
21.34	3918.	21.84	4001.	22.34	4C85.	22.84	4168.
21.35	3919.	21.85	4003.	22.35	4087.	22.85	4170.
21.36	3921.	21.86	4005.	22.36	4C88.	22.86	4172.
21.37	3923.	21.87	4006.	22.37	4C90.	22.87	4173.
21.38	3925.	21.88	4008.	22.38	4C92.	22.88	4175.
21.39	3926.	21.89	4010.	22.39	4093.	22.89	4177.
21.40	3928.	21.90	4011.	22.40	4095.	22.90	4178.
21.41	3930.	21.91	4013.	22.41	4C97.	22.91	4180.
21.42	3931.	21.92	4015.	22.42	4C98.	22.92	4182.
21.43	3933.	21.93	4016.	22.43	4100.	22.93	4183.
21.44	3935.	21.94	4C18.	22.44	4102.	22.94	4185.
21.45	3936.	21.95	4020.	22.45	4103.	22.95	4187.
21.46	3938.	21.96	4021.	22.46	4105.	22.96	4188.
21.47	3940.	21.97	4023.	22.47	4107.	22.97	4190.
21.48	3941.	21.98	4C25.	22.48	4108.	22.98	4192.
21.49	3943.	21.99	4C26.	22.49	4110.	22.99	4193.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUS
23.00	4195.	23.50	4278.	24.00	4360.	24.50	4441.
23.01	4197.	23.51	4279.	24.01	4361.	24.51	4442.
23.02	4198.	23.52	4281.	24.02	4363.	24.52	4444.
23.03	4200.	23.53	4283.	24.03	4365.	24.53	4446.
23.04	4202.	23.54	4284.	24.04	4366.	24.54	4447.
23.05	4203.	23.55	4286.	24.05	4368.	24.55	4449.
23.06	4205.	23.56	4288.	24.06	4370.	24.56	4450.
23.07	4207.	23.57	4289.	24.07	4371.	24.57	4452.
23.08	4208.	23.58	4291.	24.08	4373.	24.58	4454.
23.09	4210.	23.59	4293.	24.09	4374.	24.59	4455.
23.10	4212.	23.60	4294.	24.10	4376.	24.60	4457.
23.11	4213.	23.61	4296.	24.11	4378.	24.61	4458.
23.12	4215.	23.62	4298.	24.12	4379.	24.62	4460.
23.13	4217.	23.63	4299.	24.13	4381.	24.63	4462.
23.14	4218.	23.64	4301.	24.14	4383.	24.64	4463.
23.15	4220.	23.65	4303.	24.15	4384.	24.65	4465.
23.16	4222.	23.66	4304.	24.16	4386.	24.66	4466.
23.17	4223.	23.67	4306.	24.17	4388.	24.67	4468.
23.18	4225.	23.68	4307.	24.18	4389.	24.68	4470.
23.19	4227.	23.69	4309.	24.19	4391.	24.69	4471.
23.20	4228.	23.70	4311.	24.20	4392.	24.70	4473.
23.21	4230.	23.71	4312.	24.21	4394.	24.71	4474.
23.22	4232.	23.72	4314.	24.22	4396.	24.72	4476.
23.23	4233.	23.73	4316.	24.23	4397.	24.73	4478.
23.24	4235.	23.74	4317.	24.24	4399.	24.74	4479.
23.25	4236.	23.75	4319.	24.25	4400.	24.75	4481.
23.26	4238.	23.76	4321.	24.26	4402.	24.76	4482.
23.27	4240.	23.77	4322.	24.27	4404.	24.77	4484.
23.28	4241.	23.78	4324.	24.28	4405.	24.78	4486.
23.29	4243.	23.79	4326.	24.29	4407.	24.79	4487.
23.30	4245.	23.80	4327.	24.30	4409.	24.80	4489.
23.31	4246.	23.81	4329.	24.31	4410.	24.81	4490.
23.32	4248.	23.82	4330.	24.32	4412.	24.82	4492.
23.33	4250.	23.83	4332.	24.33	4413.	24.83	4494.
23.34	4251.	23.84	4334.	24.34	4415.	24.84	4495.
23.35	4253.	23.85	4335.	24.35	4417.	24.85	4497.
23.36	4255.	23.86	4337.	24.36	4418.	24.86	4498.
23.37	4256.	23.87	4339.	24.37	4420.	24.87	4500.
23.38	4258.	23.88	4340.	24.38	4421.	24.88	4502.
23.39	4260.	23.89	4342.	24.39	4423.	24.89	4503.
23.40	4261.	23.90	4344.	24.40	4425.	24.90	4505.
23.41	4263.	23.91	4345.	24.41	4426.	24.91	4506.
23.42	4265.	23.92	4347.	24.42	4428.	24.92	4508.
23.43	4266.	23.93	4348.	24.43	4430.	24.93	4510.
23.44	4268.	23.94	4350.	24.44	4431.	24.94	4511.
23.45	4270.	23.95	4352.	24.45	4433.	24.95	4513.
23.46	4271.	23.96	4353.	24.46	4434.	24.96	4514.
23.47	4273.	23.97	4355.	24.47	4436.	24.97	4516.
23.48	4275.	23.98	4357.	24.48	4438.	24.98	4517.
23.49	4276.	23.99	4358.	24.49	4439.	24.99	4519.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUS
25.00	4521.	25.50	4599.	26.00	4678.	26.50	4756.
25.01	4522.	25.51	4601.	26.01	4679.	26.51	4758.
25.02	4524.	25.52	4603.	26.02	4681.	26.52	4760.
25.03	4525.	25.53	4604.	26.03	4682.	26.53	4761.
25.04	4527.	25.54	4606.	26.04	4684.	26.54	4763.
25.05	4529.	25.55	4607.	26.05	4686.	26.55	4764.
25.06	4530.	25.56	4609.	26.06	4687.	26.56	4766.
25.07	4532.	25.57	4610.	26.07	4689.	26.57	4768.
25.08	4533.	25.58	4612.	26.08	4690.	26.58	4769.
25.09	4535.	25.59	4614.	26.09	4692.	26.59	4771.
25.10	4536.	25.60	4615.	26.10	4693.	26.60	4772.
25.11	4538.	25.61	4617.	26.11	4695.	26.61	4774.
25.12	4540.	25.62	4618.	26.12	4696.	26.62	4776.
25.13	4541.	25.63	4620.	26.13	4698.	26.63	4777.
25.14	4543.	25.64	4621.	26.14	4700.	26.64	4779.
25.15	4544.	25.65	4623.	26.15	4701.	26.65	4780.
25.16	4546.	25.66	4624.	26.16	4703.	26.66	4782.
25.17	4548.	25.67	4626.	26.17	4704.	26.67	4784.
25.18	4549.	25.68	4628.	26.18	4706.	26.68	4785.
25.19	4551.	25.69	4629.	26.19	4707.	26.69	4787.
25.20	4552.	25.70	4631.	26.20	4709.	26.70	4788.
25.21	4554.	25.71	4632.	26.21	4711.	26.71	4790.
25.22	4555.	25.72	4634.	26.22	4712.	26.72	4792.
25.23	4557.	25.73	4635.	26.23	4714.	26.73	4793.
25.24	4559.	25.74	4637.	26.24	4715.	26.74	4795.
25.25	4560.	25.75	4639.	26.25	4717.	26.75	4797.
25.26	4562.	25.76	4640.	26.26	4718.	26.76	4798.
25.27	4563.	25.77	4642.	26.27	4720.	26.77	4800.
25.28	4565.	25.78	4643.	26.28	4722.	26.78	4801.
25.29	4566.	25.79	4645.	26.29	4723.	26.79	4803.
25.30	4568.	25.80	4646.	26.30	4725.	26.80	4805.
25.31	4570.	25.81	4648.	26.31	4726.	26.81	4806.
25.32	4571.	25.82	4650.	26.32	4728.	26.82	4808.
25.33	4573.	25.83	4651.	26.33	4730.	26.83	4810.
25.34	4574.	25.84	4653.	26.34	4731.	26.84	4811.
25.35	4576.	25.85	4654.	26.35	4733.	26.85	4813.
25.36	4577.	25.86	4656.	26.36	4734.	26.86	4814.
25.37	4579.	25.87	4657.	26.37	4736.	26.87	4816.
25.38	4581.	25.88	4659.	26.38	4737.	26.88	4818.
25.39	4582.	25.89	4660.	26.39	4739.	26.89	4819.
25.40	4584.	25.90	4662.	26.40	4741.	26.90	4821.
25.41	4585.	25.91	4664.	26.41	4742.	26.91	4823.
25.42	4587.	25.92	4665.	26.42	4744.	26.92	4824.
25.43	4588.	25.93	4667.	26.43	4745.	26.93	4826.
25.44	4590.	25.94	4668.	26.44	4747.	26.94	4828.
25.45	4592.	25.95	4670.	26.45	4748.	26.95	4829.
25.46	4593.	25.96	4671.	26.46	4750.	26.96	4831.
25.47	4595.	25.97	4673.	26.47	4752.	26.97	4833.
25.48	4596.	25.98	4675.	26.48	4753.	26.98	4834.
25.49	4598.	25.99	4676.	26.49	4755.	26.99	4836.

MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAUSS	MILLIVOLTS	GAU
27.00	4838.	27.50	4924.	28.00	5020.	28.50	5131.
27.01	4839.	27.51	4926.	28.01	5022.	28.51	5133.
27.02	4841.	27.52	4928.	28.02	5024.	28.52	5136.
27.03	4843.	27.53	4929.	28.03	5026.	28.53	5138.
27.04	4844.	27.54	4931.	28.04	5028.	28.54	5141.
27.05	4846.	27.55	4933.	28.05	5030.	28.55	5143.
27.06	4848.	27.56	4935.	28.06	5032.	28.56	5146.
27.07	4849.	27.57	4937.	28.07	5034.	28.57	5148.
27.08	4851.	27.58	4939.	28.08	5036.	28.58	5151.
27.09	4853.	27.59	4940.	28.09	5038.	28.59	5153.
27.10	4854.	27.60	4942.	28.10	5041.	28.60	5156.
27.11	4856.	27.61	4944.	28.11	5043.	28.61	5158.
27.12	4858.	27.62	4946.	28.12	5045.	28.62	5161.
27.13	4859.	27.63	4948.	28.13	5047.	28.63	5163.
27.14	4861.	27.64	4950.	28.14	5049.	28.64	5166.
27.15	4863.	27.65	4951.	28.15	5051.	28.65	5169.
27.16	4864.	27.66	4953.	28.16	5053.	28.66	5171.
27.17	4866.	27.67	4955.	28.17	5056.	28.67	5174.
27.18	4868.	27.68	4957.	28.18	5058.	28.68	5176.
27.19	4870.	27.69	4959.	28.19	5060.	28.69	5179.
27.20	4871.	27.70	4961.	28.20	5062.	28.70	5182.
27.21	4873.	27.71	4963.	28.21	5064.	28.71	5184.
27.22	4875.	27.72	4965.	28.22	5066.	28.72	5187.
27.23	4876.	27.73	4967.	28.23	5069.	28.73	5189.
27.24	4878.	27.74	4968.	28.24	5071.	28.74	5192.
27.25	4880.	27.75	4970.	28.25	5073.	28.75	5195.
27.26	4882.	27.76	4972.	28.26	5075.	28.76	5198.
27.27	4883.	27.77	4974.	28.27	5077.	28.77	5200.
27.28	4885.	27.78	4976.	28.28	5080.	28.78	5203.
27.29	4887.	27.79	4978.	28.29	5082.	28.79	5206.
27.30	4889.	27.80	4980.	28.30	5084.	28.80	5208.
27.31	4890.	27.81	4982.	28.31	5086.	28.81	5211.
27.32	4892.	27.82	4984.	28.32	5089.	28.82	5214.
27.33	4894.	27.83	4986.	28.33	5091.	28.83	5217.
27.34	4896.	27.84	4988.	28.34	5093.	28.84	5219.
27.35	4897.	27.85	4990.	28.35	5096.	28.85	5222.
27.36	4899.	27.86	4992.	28.36	5098.	28.86	5225.
27.37	4901.	27.87	4994.	28.37	5100.	28.87	5228.
27.38	4903.	27.88	4996.	28.38	5103.	28.88	5231.
27.39	4904.	27.89	4998.	28.39	5105.	28.89	5234.
27.40	4906.	27.90	5000.	28.40	5107.	28.90	5236.
27.41	4908.	27.91	5002.	28.41	5110.	28.91	5239.
27.42	4910.	27.92	5004.	28.42	5112.	28.92	5242.
27.43	4911.	27.93	5006.	28.43	5114.	28.93	5245.
27.44	4913.	27.94	5008.	28.44	5117.	28.94	5248.
27.45	4915.	27.95	5010.	28.45	5119.	28.95	5251.
27.46	4917.	27.96	5012.	28.46	5121.	28.96	5254.
27.47	4919.	27.97	5014.	28.47	5124.	28.97	5257.
27.48	4920.	27.98	5016.	28.48	5126.	28.98	5260.
27.49	4922.	27.99	5018.	28.49	5129.	28.99	5263.

TIME, 1 MINUTES AND 1 SECONDS