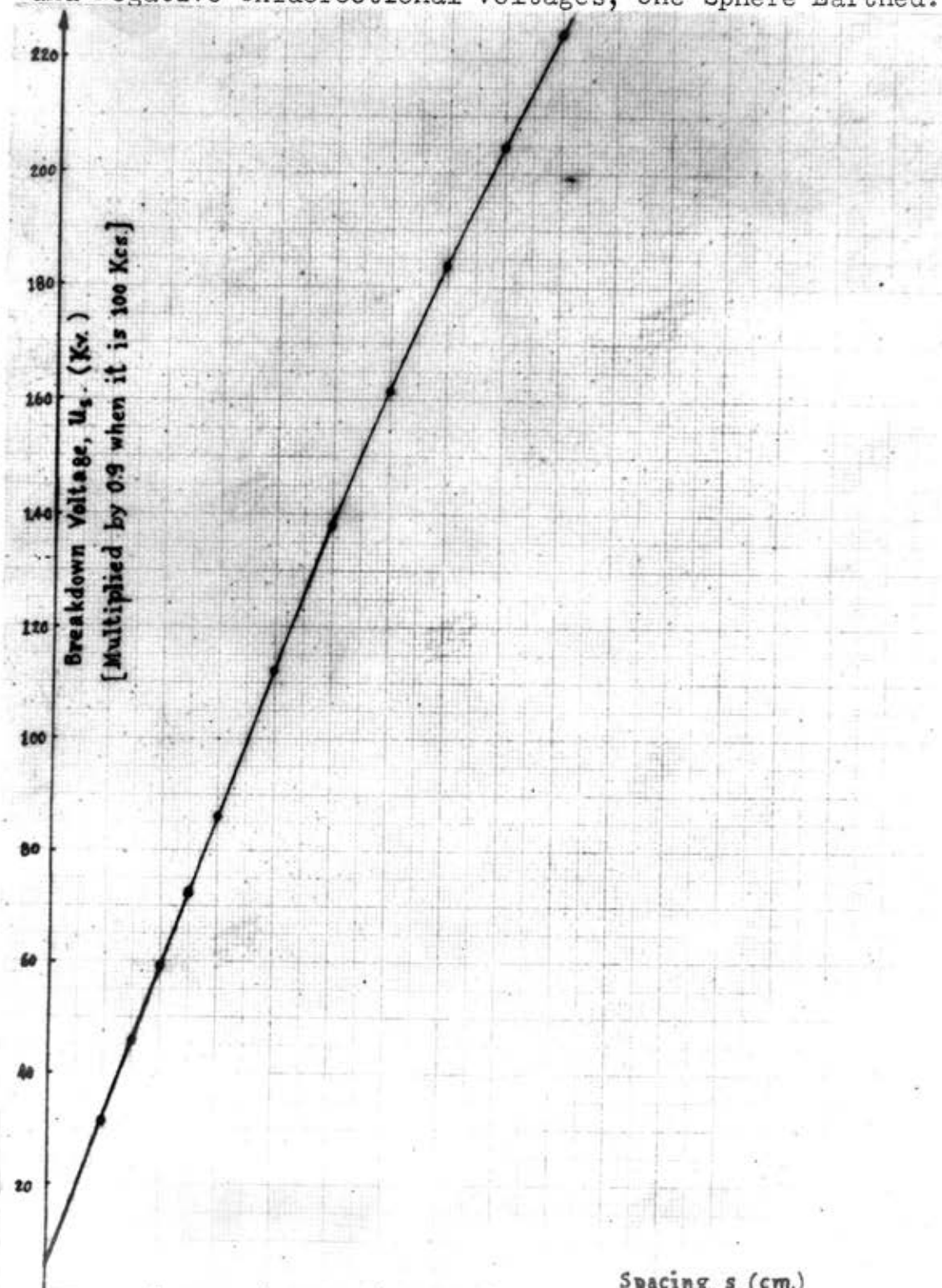
APPENDIX[16]A

Characteristic curve of 25 cm. Diameter Sphere-Gap Breakdown Voltages in kV (Peak) in Air at 20°C and 760 mm. Hg., for Power-Frequency Alternating, Negative Impulse and Negative Uniderectional Voltages, One Sphere Earthed.



APPENDIX B

1) Nagaoka's approximate formula for the Inductance of air-core coils for Single-layer Solenoid[13] is

$$L = \frac{r^2N^2}{9r + 10\ell} \times 10^{-6} \text{ henry}$$

where r = radius of the coil, inch.

ℓ = length of the coil, inch.

2) Inductance of two Concentric Solenoid of Rectangular wire for air-core coil[11] is

$$L = 4\pi N^2R \left[\log_e \frac{8R}{0.224(a+b)} - 2\right] \times 10^{-9} \text{ henry}$$

where R = radius of the coil, cm.

a, b = sides of rectangular wire.

3) Mutual Inductance between Single-layer Solenoids, Coaxial Coils Not Concentric[12] is

$$M = 0.02505 \frac{a^2A^2n_1n_2}{4\ell x}(K_1k_1 + K_3k_3 + K_5k_5) \quad \text{h.}$$

where a = smaller radius of inner coil, inch.

A = larger radius of outer coil, inch.

2ℓ = length of coil of inner coil, inch.

2x = length of coil of outer coil, inch.

n_1 & n_2 = total number of turns on the two coils.

D = axial distance between centers of coils, inch.

$$K_1 = \frac{2}{A^2}\left(\frac{x_2}{r_2} - \frac{x_1}{r_1}\right)$$

$$k_1 = 2\ell$$

$$x_1 = D - x$$

$$x_2 = D + x$$

$$r_1 = \sqrt{x_1^2 + A^2}$$

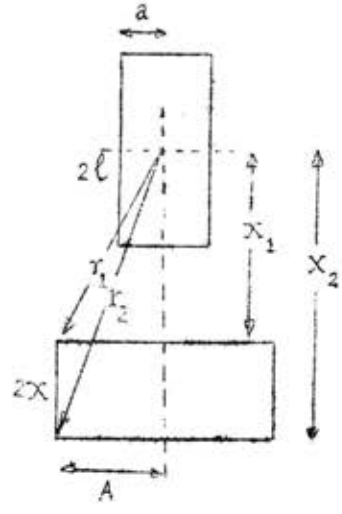
$$r_2 = \sqrt{x_2^2 + A^2}$$

$$K_3 = \frac{1}{2}\left(\frac{x_1}{r_1^5} - \frac{x_2}{r_2^5}\right)$$

$$k_3 = a^2\ell\left(3 - \frac{4\ell^2}{a^2}\right)$$

$$K_5 = -\frac{A^2}{8}\left[\frac{x_1}{r_1^9}\left(3 - \frac{4x_1^2}{A^2}\right) - \frac{x_2}{r_2^9}\left(3 - \frac{4x_2^2}{A^2}\right)\right]$$

$$k_5 = a^4\ell\left(\frac{5}{2} - 10\frac{\ell^2}{a^2} + 4\frac{\ell^4}{a^4}\right)$$



APPENDIX 10C

Data for Standard Round Copper Wires (99.8% Cu.)

S.W.G.	Diameter (mm.)	Ohms per 100 m.
10	3.251	0.1866
11	2.946	0.2276
12	2.642	0.2826
13	2.337	0.3612
14	2.032	0.4776
15	1.829	0.5897
16	1.626	0.6611
17	1.422	0.9747
18	1.219	1.3267
19	1.016	1.9105
20	0.914	2.3590
21	0.813	2.9850
22	0.711	3.8990
23	0.610	5.3070
24	0.559	6.3160
25	0.508	7.6420
26	0.457	9.4350

BIBLIOGRAPHY

1. Most of these definition terms are taken from (1) Frederich Emmons Terman, Radio Engineers' Handbook, Mc Graw-Hill Book Company, Inc., N.Y. 1943, (2) E.W. Golding, Electrical Measurements and Measuring Instruments, Sir Isaac Pitman & Son, Ltd., 4th Edition, (3) Harold Pender and Kox McIlwan, Electrical Engineers' Handbook 4th Edition, N.Y. John Wiley & Sons, Inc., (4) Morris Sturzberg, and William Oster-Held, Essentials of Radio, Mc Graw-Hill Book Company, Inc., N.Y., 1948, (5) M.G. Say, The Performance and Design of A.C. Machines, 3rd Edition, London, Sir Isaac Pitman & Sons, Inc., and (6) MIT, Electric Circuits, John Wiley & Sons, Inc.,

2. Charles Protens, Steinmetz, Theory and Calculation of Transient Electric Phenomena and Oscillations, 3rd Edition, 1920.

3. CIBA, Ltd., Booklet on Araldite epoxy resins in the electrical and electronics industries, Basle, Switzerland.

4. CIBA, Ltd., Booklet on Araldite Casting and Impregnating Resins, Basle, Switzerland.

5. E.W. Golding, Electrical Measurements and Measuring Instruments, Sir Isaac Pitman & Sons, Ltd., 4th Edition, p. 467.

6. E. Molloy; M.G. Say; R.C. Walker, The Electrical Engineer's Reference Book, London, George Newness, Ltd. 1954, p. 1.58.

7. E. Molloy; M.G. Say; R.C. Walker, The Electrical Engineer's Reference Book, London, George Newness,Ltd., 1954, p.1.61.

8. E. Molloy, M.G. Say; R.C. Walker, The Electrical Engineer's Reference Book, London, George Newness,Ltd., 1954, p.3.46.

9. E. Molloy, M.G. Say; R.C. Walker, The Electrical Engineer's Reference Book, London, George Newness,Ltd., 1954, p.1.79.

10. E. Molloy; M.G. Say; R.C. Walker, The Electrical Engineer's Reference Book, London, George Newness,Ltd., 1954, p.22.37.

11. E.W. Golding, Electrical Measurements and Measuring Instruments, Sir Isaac Pitman & Sons, Ltd., 4th Edition, p.178.

12. Frederich Emmons Terman, Radio Engineers' Handbook, Mc Graw-Hill Book Co.,Inc., N.Y., 1943, p.71.

13. Frederich Emmons Terman, Radio Engineers' Handbook, Mc Graw-Hill Book Company,Inc., N.Y.,1943, p.55.

14. Frederich Emmons Terman, Radio Engineers' Handbook, Mc Graw-Hill Book Company, Inc., N.Y., 1943, p.133.

15. Frederich Emmons Terman, Radio Engineers' Handbook, Mc Graw-Hill Book Company, Inc., N.Y.,1943,pp.26-35

16. ITT, Reference Data for Radio Engineering, 4th Edition, N.Y., p.922.

17. ITT, Reference Data for Radio Engineering, 4th Edition, N.Y., p.130.

18. J.D. Graggs and J.M. Meek, High Voltage Laboratory Technique, Butterworths Scientific Publications, London, 1954, p.104.

19. J.D. Graggs and J.M. Meek, High Voltage Laboratory Technique, Butterworths Scientific Publications, London, 1954, p.108.

20. J.D. Graggs and J.M. Meek, High Voltage Laboratory Technique, Butterworths Scientific Publications, London, 1954, p.225.

21. Sun Sivaratana, "Note on Measurement of Resistance on R-L-C circuit".