The diaphragm. Two brass pieces, placed at 65.5 mm from the source, form the collimating device. They are adjustable from 0.1 to 6 mm.

Preacceleration. A negative tension is applied to the source to detect electrons of very low energy. The negative electrode is a brass plate, in contact with the source. Facing the source, a grid consisting of 10 gold-wires of 50 microns, is situated at a distance of 10 mm. The maximum accelerating potential is 15KV.

Conclusion. The instrument can be employed to study very low energy electrons (< 20 Kev), using preaccelerating techniques. It is possible to replace emulsion by solid-state junctions.

REFERENCE

Antony, M., 1967, *Thesis, doctorate of the University Lyon.*

3

REALISATION OF A CONSTANT MAGNETIC FIELD, EXTENDING TO A DIAMETER OF 80 CMS, USING AIR CORED COILS.

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From the fundamental laws of magneto-static fields, Maxwell deduced that circular currents around spherical or ellipsoidal coils induce a constant magnetic field throughout the inner volume. Antony (1967) realised a homogeneous magnetic induction over a radius of 15 cms, using oblate ellipsoidal coils for his semi-circular magnetic spectrometer. He had to remove several bobbins around the median plane in order to introduce the spectrograph and compensated them by a semi-empirical method.

We propose a slightly different method, yielding a constant field over a wider region. Fig. 1 indicates two semi-ellipsoids separated by a distance of 5 cms to provide the air-space. We divide the minor axis into 30 equal parts, each unit representing a bobbin. We give below the values of $\frac{2B_0}{\mu_0 NI}$, the contribution of the respective pairs of bobbins from 0 to 40 cms at an interval of 5 cms.

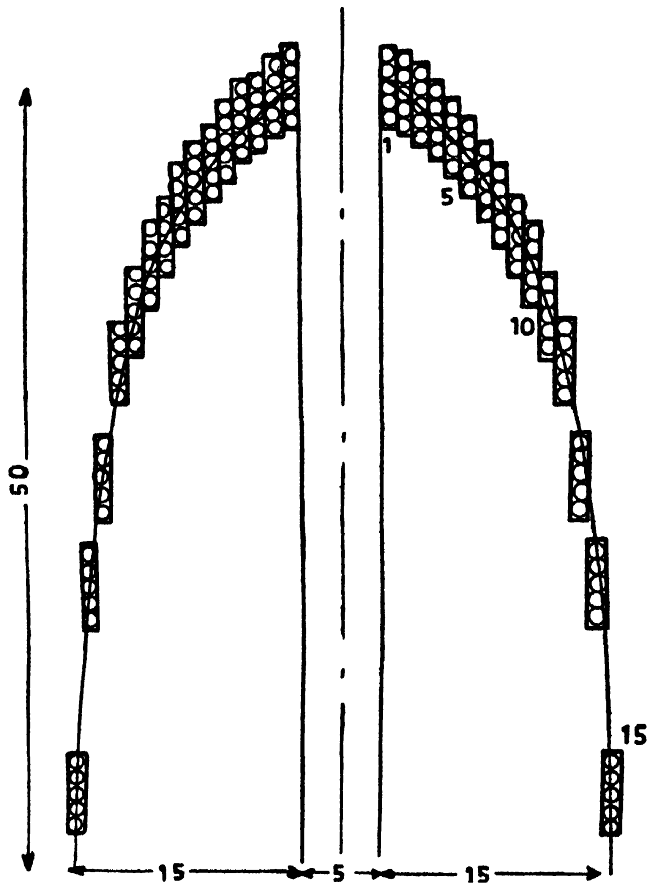

Fig. (1). Two semi-ellipsoids with an air-space of 5 cm.

Bobbin	0 cm		10	15	20	25	30	35	40
1	24,96	25,14	25,56	26,72	28,32	30,76	34,52	40,56	51,20
2	25,02	25,22	25,60	26,80	28,42	30,84	34,56	40,46	50,02
3	25,12	25,30	25,68	26,90	28,52	30,92	34,58	40,20	48,64
4	25,24	25,42	25,84	27,02	28,60	30,94	34,42	39,60	46,48
5	25,46	25,64	26,12	27,24	28,80	31,08	34,38	38,92	43,70
6	25,78	25,74	26,50	27,56	28.94	31,34	34,32	37,88	39,12
7	26,30	26,48	27,08	28,02	29,62	31,74	34,28	36,00	30,58
8	26,90	27,08	27,68	28,70	30,18	32,00	33,94	33,48	23,80
9	27,58	27,76	28,34	29,30	30,62	32,02	32,46	28,64	14,58
10	28,54	28,74	29,26	30,12	31,04	31,40	29,04	20,26	5,00
11	29,46	29,62	30,04	30,56	30,68	29,54	23,22	11,58	-1,30
12	30,56	30,62	30,72	30,44	28,72	25,74	13,96	3,78	-2,12
13	31,14	31,00	30,28	28,40	22,66	12,22	5,62	-0,93	-2,70
14	29,72	28,84	25,90	20,04	11,94	4,68	0,52	-1,20	-1,50
15	14,00	12,38	8,00	3,64	1,20	0,14	0,00	0,00	0,00
$\sum_{1}^{15} P$	395,78	394,98	392,60	391,46	388,26	385,36	379,82	369,2	3345,80

We multiply the number of turns in the first three bobbins by 1,66 and that of the bobbin 7 by 0,5. The value of kB is now :

		10	15	20		30	35	40
432,05	431,67	429,77	430,52	429,72	430,55	431,10	431,23	429,40

The mean value of $kB = 430{,}66$. Hence $\frac{\Delta B}{B} = \pm 2.10^{-3}$. It is interesting to note that to obtain the same homogeneity over a diameter of 80 cms, the diameter of a pair of Helmoltz bobbins will be about 4 meters.

The photo (fig. 2) is a model of a small ellipsoidal coil using the principle discussed above. It was constructed to produce a field of 100 KG using

Fig. 2. Ellipsoidal block for the bobbins to produce pulsed magnetic field.

pulsed currents of 30KA. An advantage of ellipsoidal geometry is the absence of radial forces, an annoying problem in intense fields.

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