During "P.C. ad lib." in the 1st and 3rd Phases a majority of the closing strokes passed on the right side of the C.V.A. but in the 2nd Phase most of the closing strokes passed on the left side. In the sagittal view during the 2nd Phase the number of closing strokes passing along the C.V.A. was greater than during the 1st and 3rd Phases.

During "P.C.F.M. ad lib." similar to the "P.C. ad lib." in the 1st and 3rd Phases most of the closing strokes passed on the right side and a much lesser number passed on the left side. During the 2nd Phase a majority of the closing strokes passed on the left side and a much smaller number on the right side. Throughout the three phases of the exercise in the frontal view a smaller number of closing strokes passed along the C.V.A. The number was even less in the 2nd Phase than during the 1st and 3rd Phases.

During "M.C. ad lib." in the frontal view, throughout the three phases of the exercise most of the closing strokes passed on the right side, but during the 2nd Phase a relatively greater number of closing strokes passed on the left side and along the C.V.A. During "S.D.C. ad lib.", in the frontal view of the 1st Phase 78% of the closing strokes passed on the right side, during the 2nd Phase 84% of the closing strokes passed on the right side and during the 3rd Phase 50% of the closing strokes passed on the right side. There was a conspicuous absence of vertical strokes along the C.V.A. both in the frontal and the sagittal views.

f. Mutual positional relations of the opening and closing strokes to the C.V.A.:-

(Tables No. 70-73)

(i) Total Edentulous Sample Performance characteristics:-

In all four exercises in the frontal view, a majority of the closing strokes passed closer to the C.V.A. than the opening strokes. Similarly in the sagittal view, a majority of the closing strokes passed distally to the opening strokes. The incidence of closing strokes passing closer to the C.V.A. than the opening strokes was highest during "P.C.F.M. ad lib." and lowest during "M.C. ad lib." The incidence of closing strokes passing distally to the opening strokes was highest during "M.C. ad lib." and lowest during "S.D.C. ad lib." The incidence of closing strokes passing anteriorly to the opening strokes was highest during "S.D.C. ad lib."

(ii) Variation of the relationship during the three phases:-

During the 2nd Phase of the "P.C. ad lib." exercise, although most of the closing strokes passed closer to the C.V.A. than the opening strokes the incidence was comparatively lower than in the 1st and 3rd Phases. In the sagittal view the incidence of closing strokes passing posterior to the opening strokes was highest during the 2nd Phase.

The 2nd Phase of "P.C.F.M. ad lib." was similar to the "P.C. ad lib." exercise in that the number of closing strokes passing closer to the C.V.A. was comparatively lower than in the

Table No. 70

P.C. ad. Lib. Edentulous Subjects B.C.D.E

f. Mutual positional relation of the opening and closing strokes to the C.V.A.	Subject	No. of cycles	1 From closed mouth position	2 From open mouth position	Frontal view: 3 On the right side of C.V.A.	Frontal view: 4 On the C.V.A.	Frontal view: 5 On the left side of C.V.A.	Sagittal view: 6 Anterior to the C.V.A.	Sagittal view: 7 On the C.V.A.	Sagittal view: 8 Posterior to the C.V.A.
1st Phase	B	5			3	1	1	Nil	5	Nil
	C	4			2	2	Nil	Nil	1	3
	D	5			1	4	Nil	1	4	Nil
	E	4			Nil	4	Nil	2	2	Nil
	Total	18			6	11	1	3	12	3
Percentage Incidence in the Total Edentulous sample					33%	61%	6%	17%	67%	17%
2nd Phase	B	5			1	3	1	Nil	5	Nil
	C	4			2	2	Nil	Nil	3	1
	D	5			Nil	5	Nil	Nil	5	Nil
	E	3			3	Nil	Nil	Nil	3	Nil
	Total	17			6	10	1	Nil	16	1
Percentage Incidence in the Total Edentulous sample					35%	59%	6%	Nil	94%	6%
3rd Phase	B	5			2	2	1	Nil	5	Nil
	C	4			2	2	Nil	1	3	Nil
	D	5			Nil	5	Nil	Nil	5	Nil
	E	3			1	2	Nil	1	2	Nil
	Total	17			5	11	1	2	15	Nil
Percentage Incidence in the Total Edentulous sample					29%	65%	6%	12%	88%	Nil
Percentage Incidence in the Total Edentulous sample during the Total performance in the exercise		52			33%	62%	6%	10%	83%	8%

Table No. 71

P.C.F.M. ad. Lib.
Edentulous Subjects
B.C.D.E.

f. Mutual positional relation of opening and closing strokes to C.V.A.	Subject	No. of cycles	1 From closed mouth position	2 From open mouth position	Frontal view: 3 On the right side of C.V.A.	Frontal view: 4 On the C.V.A.	Frontal view: 5 On the left side of C.V.A.	Sagittal view: 6 Anterior to the C.V.A.	Sagittal view: 7 On the C.V.A.	Sagittal view: 8 Posterior to the C.V.A.
1st Phase	B	5			2	3	Nil	Nil	5	Nil
	C	4			2	2	Nil	Nil	3	1
	D	Nil			Nil	Nil	Nil	Nil	Nil	Nil
	E	5			1	4	Nil	2	3	Nil
	Total	14			5	9	Nil	2	11	1
Percentage Incidence in the Total Edentulous sample					36%	64%	Nil	14%	79%	7%
2nd Phase	B	5			2	3	Nil	Nil	5	Nil
	C	5			1	4	Nil	1	4	Nil
	D	Nil			Nil	Nil	Nil	Nil	Nil	Nil
	E	4			3	1	Nil	Nil	4	Nil
	Total	14			6	8	Nil	1	13	Nil
Percentage Incidence in the Total Edentulous sample					43%	57%	Nil	7%	93%	Nil
3rd Phase	B	5			Nil	5	Nil	Nil	5	Nil
	C	4			Nil	4	Nil	2	2	Nil
	D	Nil			Nil	Nil	Nil	Nil	Nil	Nil
	E	4			2	2	Nil	Nil	4	Nil
	Total	13			2	11	Nil	2	11	Nil
Percentage Incidence in the Total Edentulous sample					15%	85%	Nil	15%	85%	Nil
Percentage Incidence in the Total Edentulous sample during the Total performance in the exercise		41			32%	68%	Nil	12%	85%	2%

Table No. 72

M.C. ad. Lib. Edentulous Subjects B.C.D.E.

f. Mutual positional relation of opening and closing strokes to C.V.A.	Subject	No. of cycles	1 From close mouth position	2 From open mouth position	Frontal view: 3 On the right side of C.V.A.	Frontal view: 4 On the C.V.A	Frontal view: 5 On the left side of C.V.A.	Sagittal view: 6 Anterior to the C.V.A.	Sagittal view: 7 On the C.V.A.	Sagittal view: 8 Posterior to the C.V.A.
1st Phase	B	5			1	4	Nil	Nil	5	Nil
	C	5			5	Nil	Nil	1	4	Nil
	D	6			3	3	Nil	1	5	Nil
	E	4			3	1	Nil	2	2	Nil
	Total	20			12	8	Nil	4	16	Nil
Percentage Incidence in the Total Edentulous sample					60%	40%	Nil	20%	8%	Nil
2nd Phase	B	5			Nil	5	Nil	Nil	5	Nil
	C	5			4	1	Nil	1	3	1
	D	5			2	3	Nil	1	4	Nil
	E	3			2	1	Nil	Nil	3	Nil
	Total	18			8	10	Nil	2	15	1
Percentage Incidence in the Total Edentulous sample					44%	56%	Nil	11%	83%	6%
3rd Phase	B	4			1	3	Nil	Nil	4	Nil
	C	4			2	2	Nil	Nil	4	Nil
	D	7			2	5	Nil	Nil	7	Nil
	E	4			2	2	Nil	Nil	4	Nil
	Total	19			7	12	Nil	Nil	19	Nil
Percentage Incidence in the Total Edentulous sample					37%	63%	Nil	Nil	100%	Nil
Percentage Incidence in the Total Edentulous sample during the Total performance in the exercise		57			47%	53%	Nil	10%	88%	2%

Table No. 73

S.D.C. ad. Lib.
Edentulous Subjects
B.C.D.E.

f. Mutual Positional relation of opening and closing strokes to C.V.A.	Sub-ject	No. of cycles	1 From closed mouth posit-ion	2 From open mouth posit-ion	Frontal view 3 On the right side of C.V.A.	4 On the C.V.A.	5 On the left side of C.V.A.	Ssgittal view 6 Ant-erior to the C.V A.	7 On the C.V.A.	8 Post-erior to the C.V.A.
1st Phase	B	5			3	2	Nil	3	2	Nil
	C	4			2	2	Nil	2	2	Nil
	D	5			2	3	Nil	Nil	5	Nil
	E	4			2	2	Nil	1	3	Nil
	Total	18			9	9	Nil	6	12	Nil
Percentage Incid-ence in the Total Edentulous sample					50%	50%	Nil	33%	67%	Nil
2nd Phase	B	5			2	3	Nil	Nil	5	Nil
	C	5			2	3	Nil	Nil	4	1
	D	5			4	1	Nil	1	4	Nil
	E	4			1	3	Nil	1	3	Nil
	Total	19			9	10	Nil	2	16	1
Percentage Incid-ence in the Total Edentulous sample					47%	53%	Nil	11%	84%	5%
3rd Phase	B	5			Nil	5	Nil	Nil	5	Nil
	C	5			1	4	Nil	1	4	Nil
	D	4			Nil	4	Nil	Nil	4	Nil
	E	4			1	3	Nil	Nil	4	Nil
	Total	18			2	16	Nil	1	17	Nil
Percentage Incid-ence in the Total Edentulous sample					11%	89%	Nil	6%	94%	Nil
Percentage Incid-ence in the Total Edentulous sample during the Total performance in the exercise		55			36%	64%	Nil	17%	82%	2%

1st and 3rd Phases. Similarly in the sagittal view the incidence of closing strokes passing distal to the opening stroke was highest in the 2nd Phase.

During "M.C. ad lib." in the frontal view of the 1st Phase 60% of the opening strokes passed closer to the C.V.A. than the closing strokes, but in the sagittal view 80% of the closing strokes passed posterior to the opening strokes. In the 2nd and 3rd Phases most of the closing strokes passed closer to the C.V.A. than the opening strokes. The number of closing strokes passing distally to the opening strokes progressively increased and in the 3rd Phase all strokes passed distally.

During "S.D.C. ad lib.", in the frontal view of the 1st Phase equal number of opening and closing strokes passed closer to the C.V.A. but in the sagittal view 67% of the closing strokes passed distally to the opening strokes. In the 2nd and 3rd Phases most of the closing strokes passed closer to the C.V.A. than the opening strokes. The number of closing strokes passing distally to the opening strokes progressively increased in the 2nd and 3rd Phases.

g. <u>The point of termination of the closing strokes</u>

(Tables No. 74-77)

(i) Total Edentulous Sample Performance characteristics:-

During "P.C. ad lib.", 60% of the closing strokes terminated in open mouth positions. In the frontal view most of the closing strokes on the left side of the C.V.A. a lesser number terminated on the right side and a still lesser number on the C.V.A.

In the sagittal view most of the closing strokes terminated on the C.V.A., a lesser number terminated posterior to the C.V.A. and a still lesser number anterior to C.V.A.

During "P.C.F.M. ad lib.", 56% of the closing strokes terminated in open mouth positions. 44% of the closing strokes terminated on the right side and 44% on the C.V.A. in the frontal view. 10% of the closing strokes terminated on the left side of the C.V.A.

In the sagittal view, 39% of the closing strokes terminated on the C.V.A. 37% posterior to the C.V.A. and 24% anterior to the C.V.A.

During "M.C. ad lib.", most of the closing strokes terminated in closed mouth positions and a lesser number terminated in open mouth positions. In the frontal view, 58% of closing strokes terminated on the C.V.A., 21% to the right side of C.V.A. and 21% to the left side of the C.V.A. In the sagittal view most of the closing strokes terminated posterior to the C.V.A. a lesser number terminated anterior to the C.V.A. and some on the C.V.A.

During "S.D.C. ad lib.", 91% of the closing strokes terminated in open mouth positions. In the frontal view, 60% of the closing strokes terminated on the right side, 24% on the C.V.A. A much lesser number on the left side of C.V.A. In the sagittal view 42% of the closing strokes terminated anterior to the C.V.A., 27% posterior to the C.V.A.

and 31% on the C.V.A.

(ii) Variations of the relationship during the three phases:-

During "P.C. ad lib." in the 1st and 3rd Phases most of the closing strokes terminated in open mouth positions while in the 2nd Phase most of the closing strokes terminated in closed mouth positions. In all three phases the majority of the closing strokes terminated on the left side of the C.V.A., but the incidence was much greater during the 2nd Phase. In the sagittal view most of the closing strokes during the three phases terminated on the C.V.A. but the incidence was greatest during the 2nd Phase.

During the "P.C.F.M. ad lib." in the 1st Phase an equal number of closing strokes terminated in both open and closed mouth positions. During the 2nd and 3rd Phases the number of closing strokes terminating in open mouth positions increased progressively. In the 1st and 2nd Phases most of the closing strokes terminated on the C.V.A. in the frontal view. In the fronal view of the 3rd Phase most of the closing strokes terminated on the right side, a lesser number on the C.V.A. and a still lesser number on the left side. In the sagittal view during the 1st Phase most of the closing strokes terminated on the C.V.A. a lesser number terminated posterior to the C.V.A. and a still lesser number terminated anterior to the C.V.A. During the 2nd Phase the number of strokes terminating anterior to and posterior to the C.V.A. was equal and the number of strokes ending on the C.V.A. decreased. In the 3rd Phase most of the closing

Table No. 74

P.C. ad. Lib.
Edentulous Subjects
B.C.D E.

g. The Point of Termination of the closing stroke	Subject	No. of cycles	1 From closed mouth position	2 From open mouth position	Frontal view: 3 On the right side of C.V.A.	Frontal view: 4 On the C.V.A.	Frontal view: 5 On the left side of C.V.A.	Sagittal view: 6 Anterior to the C.V.A.	Sagittal view: 7 On the C.V.A.	Sagittal view: 8 Posterior to the C.V.A.
1st Phase	B	5	4	1	2	Nil	3	Nil	1	4
	C	4	Nil	4	Nil	Nil	4	2	2	Nil
	D	5	Nil	5	5	Nil	Nil	Nil	3	2
	E	4	1	3	Nil	1	3	Nil	3	1
	Total	18	5	13	7	1	10	2	9	7
Percentage Incidence in the Total Edentulous sample			28%	72%	39%	6%	56%	11%	50%	39%
2nd Phase	B	5	5	Nil	Nil	Nil	5	Nil	3	2
	C	4	1	3	Nil	Nil	4	1	3	Nil
	D	5	Nil	5	5	Nil	Nil	1	2	2
	E	3	3	Nil	Nil	Nil	3	Nil	3	Nil
	Total	17	9	8	5	Nil	12	2	11	4
Percentage Incidence in the Total Edentulous sample			53%	47%	29%	Nil	71%	12%	65%	24%
3rd Phase	B	5	5	Nil	Nil	Nil	5	Nil	1	4
	C	4	2	2	Nil	Nil	4	Nil	3	1
	D	5	Nil	5	3	2	Nil	2	2	1
	E	3	Nil	3	3	Nil	Nil	1	2	Nil
	Total	17	7	10	6	2	9	3	8	6
Percentage Incidence in the Total Edentulous sample			41%	59%	35%	12%	53%	18%	47%	35%
Percentage Incidence in the Total Edentulous sample during the Total performance in the exercise		52	40%	60%	35%	6%	60%	13%	54%	33%

Table No. 75

P.C.F.M. ad. Lib.
Edentulous Subjects
B.C.D E.

9. The point of termination of the closing stroke	Subject	No. of cycles	1 From closed mouth position	2 From open mouth position	Frontal view 3 On the right side of C.V A.	4 On the C.V.A.	5 On the left side of C.V.A.	Sagittal view 6 Anterior to the C.V.A.	7 On the C.V.A.	8 Posterior to the C.V.A.
1st Phase	B	5	5	Nil	Nil	5	Nil	Nil	2	3
	C	4	1	3	Nil	2	2	1	2	1
	D	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	5	1	4	4	Nil	Nil	1	4	Nil
	Total	14	7	7	4	7	2	2	8	4
Percentage Incidence in the Total Edentulous sample			50%	50%	29%	50%	14%	14%	57%	29%
2nd Phase	B	5	5	Nil	Nil	5	Nil	Nil	Nil	5
	C	5	Nil	5	4	Nil	1	4	1	Nil
	D	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	4	1	3	2	2	Nil	1	3	Nil
	Total	14	6	8	6	7	1	5	4	5
Percentage Incidence in the Total Edentulous sample			43%	57%	43%	50%	7%	36%	29%	36%
3rd Phase	B	5	5	Nil	3	2	Nil	Nil	Nil	5
	C	4	Nil	4	4	Nil	Nil	2	1	1
	D	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	4	Nil	4	1	2	1	1	3	Nil
	Total	13	5	8	8	4	1	3	4	6
Percentage Incidence in the Total Edentulous sample			38%	62%	62%	31%	8%	23%	31%	46%
Percentage Incidence in the Total Edentulous sample during the Total performance in the exercise		41	44%	56%	44%	44%	10%	24%	39%	37%

Table No. 76

M.C. ad. Lib

Edentulous Subjects

B.C.D.E.

g. The points of termination of the closing strokes	Subject	No. of cycles	1 From closed mouth position	2 From open mouth position	Frontal view: 3 On the right side of C.V A.	Frontal view: 4 On the C.V.A.	Frontal view: 5 On the left side of C.V.A.	Sagittal view: 6 Anterior to the C.V.A.	Sagittal view: 7 On the C.V.A.	Sagittal view: 8 Posterior to the C.V.A.
1st Phase	B	5	5	Nil	Nil	4	1	Nil	2	3
	C	5	5	Nil	1	1	3	4	1	Nil
	D	6	Nil	6	2	3	1	Nil	1	5
	E	4	2	2	Nil	4	Nil	4	Nil	Nil
	Total	20	12	8	3	12	5	8	4	8
Percentage Incidence in the Total Edentulous sample			60%	40%	15%	60%	25%	40%	20%	40%
2nd Phase	B	5	5	Nil	Nil	4	1	Nil	Nil	5
	C	5	5	Nil	Nil	1	4	4	1	Nil
	D	5	Nil	5	1	4	Nil	Nil	1	4
	E	3	3	Nil	Nil	3	Nil	2	1	Nil
	Total	18	13	5	1	12	5	6	3	9
Percentage Incidence in the Total Edentulous sample			72%	28%	6%	67%	28%	33%	17%	50%
3rd Phase	B	4	4	Nil	4	Nil	Nil	Nil	Nil	4
	C	4	4	Nil	Nil	3	1	4	Nil	Nil
	D	7	Nil	7	4	2	1	Nil	2	5
	E	4	2	2	Nil	4	Nil	2	2	Nil
	Total	19	10	9	8	9	2	6	4	9
Percentage Incidence in the Total Edentulous sample			53%	47%	42%	47%	11%	32%	21%	47%
Percentage Incidence in the Total Edentulous sample during the Total performance in the exercise		57	62%	38%	21%	58%	21%	35%	19%	46%

Table No. 77

S.D.C. ad. Lib.
Edentulous Subjects
B.C.D.E.

B.C.D.E.

9. Point of termination of the closing strokes	Subject	No. of cycles	1 From closed mouth position	2 From open mouth position	Frontal view 3 On the right side of C.V A.	4 On the C.V.A.	5 On the left side of C.V.A.	Sagittal view 6 Anterior to the C.V.A.	7 On the C.V.A.	8 Posterior to the C.V.A.
1st Phase	B	5	1	4	4%	1	Nil	Nil	4	1
	C	4	Nil	4	3	1	Nil	4	Nil	Nil
	D	5	Nil	5	4	1	Nil	1	Nil	4
	E	4	Nil	4	4	Nil	Nil	1	Nil	3
	Total	18	1	17	15	3	Nil	6	4	8
Percentage Incidence in the Total Edentulous sample			6%	94%	83%	17%	Nil	33%	22%	44%
2nd Phase	B	5	Nil	5	Nil	3	2	2	3	Nil
	C	5	Nil	5	2	1	2	5	Nil	Nil
	D	5	Nil	5	3	2	Nil	Nil	1	4
	E	4	1	3	4	Nil	Nil	3	1	Nil
	Total	19	1	18	9	6	4	10	5	4
Percentage Incidence in the Total Edentulous sample			5%	95%	47%	32%	21%	53%	26%	21%
3rd Phase	B	5	2	3	Nil	Nil	5	Nil	5	Nil
	C	5	Nil	5	4	1	Nil	5	Nil	Nil
	D	4	Nil	4	2	2	Nil	Nil	2	2
	E	4	1	3	3	1	Nil	2	1	1
	Total	18	3	15	9	4	5	7	8	3
Percentage Incidence in the Total Edentulous sample			17%	83%	50%	22%	28%	39%	44%	17%
Percentage Incidence in the Total Edentulous sample during the Total performance in the exercise		57	9%	91%	60%	24%	16%	42%	31%	27%

strokes terminated distal to the C.V.A.

During "M.C. ad lib.", in the 2nd Phase the incidence of closing strokes terminating in closed mouth positions was the highest. In the 1st and 3rd Phases the incidence of closing strokes terminating in open mouth positions was comparatively higher than in the 2nd Phase. In the frontal view most of the closing strokes terminated on the C.V.A. the incidence being the highest during the 2nd Phase. In the sagittal view, during the 1st Phase an equal number of closing strokes terminated anterior and posterior to the C.V.A. During the 2nd and 3rd Phases a majority of closing strokes terminated posterior to the C.V.A. The incidence was the highest during the 2nd Phase.

During "S.D.C. ad lib.", in the three phases of the exercise nearly all the closing strokes terminated in open-mouth positions. In the frontal view during the three phases a majority of the closing strokes terminated on the right side of the C.V.A. The incidence was the highest in the 1st Phase and lowest in the 2nd Phase. In the sagittal view during the 1st Phase most of the closing strokes terminated posterior to the C.V.A., in the 2nd Phase most of the closing strokes terminated anterior to C.V.A. In the 3rd Phase most of the closing strokes terminated on the C.V.A.

POSITIONAL PREFERENCE INDEX IN THE EDENTULOUS SUBJECTS B, C, D AND E:

The P.P.I. for the total edentulous sample, individual edentulous subjects, the three phases of the total kinematic performance, and the total edentulous sample kinematic performance during the four exercises was calculated as for the dentulous subject from the Tables listed below:

(i) Total Kinematic Masticatory Performance P.P.I. in the Edentulous State (calculated from Tables No. 40 - 46) : + 12.

(ii) Total Kinematic Performance P.P.I. in individual Edentulous Subjects (calculated from Tables No. 40 - 46) :

B	C	D	E
+ 19	- 1	+ 19	+ 12

(iii) Total Kinematic Masticatory Performance P.P.I. during the three phases of the masticatory sequences in the Edentulous State : (calculated from Tables No. 47 - 49)

1st Phase	2nd Phase	3rd Phase
+ 14	+ 10	+ 13

(iv) P.P.I. during "P.C. ad lib." exercise (calculated from Tables No. 50, 54, 58, 62, 66, 70 and 74) :

Total performance in the Edentulous State : + 12

1st Phase	2nd Phase	3rd Phase
+ 12	+ 10	+ 13

(v) P.P.I. during "P.C.F.M. ad lib." exercise (calculated from Tables No. 51, 55, 59, 63, 67, 71 and 75) :

Total performance in the Edentulous State : + 15

1st Phase	2nd Phase	3rd Phase
+ 17	+ 12	+ 15

(vi) P.P.I. during "M.C. ad lib." exercise (calculated from Tables No. 52, 56, 60, 64, 68, 72 and 76) :

Total performance in the Edentulous State : + 14

1st Phase	2nd Phase	3rd Phase
+ 13	+ 13	+ 17

(vii) P.P.I. during "S.D.C. ad lib." exercise (calculated from Tables No. 53, 57, 61, 65, 69, 73 and 77) :

Total performance in the Edentulous State :

1st Phase	2nd Phase	3rd Phase
+ 15	+ 6	+ 9

II. Role of Cuspal Guidance during ad lib. Masticatory Exercises in Edentulous Subjects B, C, D and E.

(Tables No. 78 - 89)

1. Incidence of cuspal guidance in the four masticatory exercises in the individual Edentulous Subjects:-

Tables No. 78 - 81 display the incidence of cuspal guidance during the four masticatory exercises in the four edentulous subjects. Although in ultimate detail the four subjects performed the four exercises differently, (Subject 'D' had specific problems, which are discussed later) some degree of resemblance can be seen in the performance of some of the individual exercises and the total performance by each of the Subjects 'B', 'C', and 'E'. These subjects show a 100% incidence of cuspal guidance during "M.C. ad lib.", a very high incidence of cuspal guidance during "P.C. ad lib." (100% in Subjects 'B' and 'C', and 80% in Subject 'E') and a fairly high incidence during "S.D.C. ad lib." (93% in Subject 'B', 75% in Subject 'E' and 57% in Subject 'C') In most of the cycles in these subjects cuspal guidance occurred in both the opening as well as the closing strokes. In some cycles cuspal guidance occurred in both the strokes and also in both the frontal and sagittal views of these strokes.

Cuspal guidance when interpreted as achievement of

Table No. 78

Incidence of Cuspal Guidance in the four Masticatory exercise in Edentulous Subject B		Total No. of cycles	No.of cycles showing C.G.	No.of cycles showing No C.G.	No.of cycles showing C.G. only in opening stroke	No.of cycles showing C.G. only in closing stroke	No. of cycles showing C.G. in both strokes	No. of cycles with C.G. in both strokes in Frontal and Sagittal views
P.C. ad. lib.	1st Phase	5	5	Nil	1	2	Nil	2
	2nd Phase	5	5	Nil	Nil	Nil	3	2
	3rd Phase	5	5	Nil	Nil	1	2	2
Percentage Incidence during the Exercise		15	15=100%	Nil	1=7%	3=20%	5=33%	6=40%
P.C. F.M ad. lib.	1st Phase	5	4	1	1	1	2	Nil
	2nd Phase	5	5	Nil	Nil	Nil	2	3
	3rd Phase	5	5	Nil	Nil	Nil	3	2
Percentage Incidence during the Exercise		15	14=93%	1=7%	1=7%	1=7%	7=47%	5=33%
M.C. ad. lib.	1st Phase	5	5	Nil	Nil	1	2	2
	2nd Phase	5	5	Nil	Nil	Nil	3	2
	3rd Phase	5	5	Nil	1	Nil	3	1
Percentage Incidence during the Exercise		15	15=100%	Nil	1=7%	1=7%	8=53%	5=33%
S.D.C. ad. lib.	1st Phase	5	5	Nil	Nil	1	4	Nil
	2nd Phase	5	4	1	1	1	1	1
	3rd Phase	5	5	Nil	Nil	Nil	5	Nil
Percentage Incidence during the Exercise		15	14=93%	1=7%	1=7%	2=13%	10=67%	1=7%
Percentage Incidence during the Total performance		60	96%	4%	7%	12%	50%	28%

Table No. 79

Incidence of Cuspal Guidance in the four Masticatory exercise in Edentulous Subject C.		Total No. of cycles	No. of cycles showing C.G.	No. of cycles showing No C.G.	No. of cycles showing C.G. only in opening stroke	No. of cycles showing C.G. only in closing stroke	No. of cycles showing C.G. in both strokes	No. of cycles with C.G. in both strokes in Frontal and Sagittal views
P.C. ad. Lib.	1st Phase	4	4	Nil	Nil	Nil	2	2
	2nd Phase	4	4	Nil	Nil	Nil	3	1
	3rd Phase	4	4	Nil	Nil	1	3	Nil
Percentage Incidence during the Exercise		12	12=100%	Nil	Nil	1= 8%	8=67%	3=25%
P.C.F.M. ad. Lib.	1st Phase	4	1	3	1	Nil	Nil	Nil
	2nd Phase	5	Nil	5	Nil	Nil	Nil	Nil
	3rd Phase	4	1	3	1	Nil	Nil	Nil
Percentage Incidence during the Exercise		13	2=15%	11 = 85%	2=15%	Nil	Nil	Nil
M.C.ad. Lib.	1st Phase	5	5	Nil	Nil	1	1	3
	2nd Phase	5	5	Nil	Nil	Nil	2	3
	3rd Phase	4	4	Nil	Nil	Nil	4	Nil
Percentage Incidence during the Exercise		14	14=100%	Nil	Nil	1=7%	7=50%	6= 43%
S.D.C ad. Lib.	1st Phase	4	1	3	Nil	1	Nil	Nil
	2nd Phase	5	2	3	1	Nil	1	Nil
	3rd Phase	5	5	Nil	1	Nil	4	Nil
Percentage Incidence during the Exercise		14	8=57%	6=43%	2=14%	1=7%	5=36%	Nil
Percentage Incidence during the Total performance		53	68%	32%	7%	6%	38%	17%

Table No. 80

Incidence of Cuspal Guidance in the four Masticatory exercise in Edentulous Subject D.		Total No. of cycles	No. of cycles showing C.G.	No. of cycles showing No C.G.	No. of cycles showing C.G. only in opening stroke	No. of cycles showing C.G. only in closing stroke	No. of cycles showing C.G. in both strokes	No. of cycles with C.G. in both strokes in Frontal and Sagital views
P.C. ad. Lib.	1st Phase	5	Nil	5	Nil	Nil	Nil	Nil
	2nd Phase	5	1	4	Nil	1	Nil	Nil
	3rd Phase	5	2	3	1	Nil	1	Nil
Percentage Incidence during the Exercise		15	3=20%	12=80%	1=7%	1=7%	1=7%	Nil
P.C.F.M. ad. Lib.	1st Phase 2nd Phase 3rd Phase	Exercise not Recorded						
Percentage Incidence during the Exercise								
M.C. ad. Lib.	1st Phase	6	Nil	6	Nil	Nil	Nil	Nil
	2nd Phase	5	Nil	5	Nil	Nil	Nil	Nil
	3rd Phase	7	Nil	7	Nil	Nil	Nil	Nil
Percentage Incidence during the Exercise		18	Nil	18=100%	Nil	Nil	Nil	Nil
S.D.C. ad. Lib.	1st Phase	5	2	3	1	1	Nil	Nil
	2nd Phase	5	Nil	5	Nil	Nil	Nil	Nil
	3rd Phase	4	Nil	4	Nil	Nil	Nil	Nil
Percentage Incidence during the Exercise		14	2=14%	12=86%	1=7%	1=7%	Nil	Nil
Percentage Incidence during the Total performance		47	11%	89%	5%	4%	2%	Nil

Table No. 81

Incidence of Cuspal Guidance in the four Masticatory exerciae in Edentulous Subject E		Total No. of cycles	No. of cycles showing C.G.	No. of cycles showing No C.G.	No. of cycles showing C.G. only in opening stroke	No. of cycles showing C.G. only in closing stroke	No. of cycles showing C.G. in both strokes	No. of cycles with C.G. in both strokes in Frontal and Sagittal views
P.C. ad. Lib	1st Phase	4	3	1	Nil	1	2	Nil
	2nd Phase	3	3	Nil	Nil	Nil	3	Nil
	3rd Phase	3	2	1	1	Nil	Nil	1
Percentage Incidence during the Exercise		10	8=80%	2=20%	1=10%	1=10%	5=50%	1=10%
P.C.F.M. ad. Lib.	1st Phase	5	4	1	1	2	1	Nil
	2nd Phase	4	3	1	Nil	1	2	Nil
	3rd Phase	4	3	1	1	2	Nil	Nil
Percentage Incidence during the Exercise		13	10=77%	3=23%	2=15%	5=38%	3=23%	Nil
M.C. ad. Lib.	1st Phase	4	4	Nil	Nil	Nil	2	2
	2nd Phase	3	3	Nil	Nil	Nil	2	1
	3rd Phase	4	4	Nil	Nil	1	1	2
Percentage Incidence during the Exercise		11	11=100%	Nil	Nil	1=8%	5=45%	5=45%
S.D.C. ad. Lib	1st Phase	4	1	3	1	Nil	Nil	Nil
	2nd Phase	4	4	Nil	Nil	Nil	3	1
	3rd Phase	4	4	Nil	Nil	Nil	4	Nil
Percentage Incidence during the Exercise		12	9=75%	3=25%	1=8%	Nil	7=58%	1=8%
Percentage Incidence during the Total performance		46	83%	17%	8%	14%	44%	16%

tooth contact subsequent to penetration of food by the teeth, can be considered indicative of subject's achievement of one of the objectives of mastication, i.e. comminution of food. Thus, the total incidence of cuspal guidance, the incidence of cuspal guidance in the opening and closing strokes of the same cycle, and the incidence of cuspal guidance in the frontal and sagittal views of the opening and closing strokes of the cycle can be considered reflective of subject's masticatory proficiency.

Considering these features, the total performance of Subject 'B' suggests a very high degree of proficiency. Subject 'E' was less proficient and Subject 'C' less still. The total performance of Subject 'D' suggests very low proficiency. As mentioned earlier, in Subject 'D' the lower alveolar ridge was very thin labio-lingually and the crest of the ridge was covered with non-displaceable mucoperiosteum giving it a bulbus cross-section. This ridge had good retention qualities but impaired stress bearing qualities. After performing the guided movements and simulated chewing exercises the subject was not at ease during the chewing exercises. At the conclusion of the session he indicated that his alveolar ridges were sore, and the soreness prevented him from chewing properly.

Table No. 82

Incidence of Cuspal Guidance in the three phases of P.C. ad. Lib. exercise in Edentulous Subjects	Subject	Total number of cycles	Number of cycles showing Cuspal Guidance	Number of cycles showing No Cuspal Guidance	Number of cycles showing Cuspal Guidance only in the opening strokes	Number of cycles showing Cuspal Guidance only in the closing strokes	Number of cycles showing Cuspal Guidance in both strokes
1st Phase	B	5	5	Nil	1	2	2
	C	4	4	Nil	Nil	Nil	4
	D	5	Nil	5	Nil	Nil	Nil
	E	4	3	1	Nil	1	2
	Total	18	12	6	1	3	8
Percentage Incidence during the Phase			67%	33%	6%	17%	44%
2nd Phase	B	5	5	Nil	Nil	Nil	5
	C	4	4	Nil	Nil	Nil	4
	D	5	1	4	Nil	1	Nil
	E	3	3	Nil	Nil	Nil	3
	Total	17	13	4	Nil	1	12
Percentage Incidence during the Phase			76%	24%	Nil	6%	71%
3rd Phase	B	5	5	Nil	Nil	1	4
	C	4	4	Nil	Nil	1	3
	D	5	2	3	1	Nil	1
	E	3	2	1	1	Nil	1
	Total	17	13	4	2	2	9
Percentage Incidence during the Phase			76%	24%	12%	12%	53%
Percentage Incidence in the Total Edentulous Sample During the Exercise		52	73%	27%	6%	12%	56%

Table No. 83

Incidence of Cuspal Guidance in the three phases of P.C.F.M. ad. Lib. Exercise in Edentulous Subjects	Subject	Total number of cycles	Number of cycles showing Cuspal Guidance	Number of cycles showing No Cuspal Guidance	Number of cycles showing Cuspal Guidance only in the opening strokes	Number of cycles showing Cuspal Guidance only in the closing strokes	Number of cycles showing Cuspal Guidance in both strokes
1st Phase	B	5	4	1	1	1	2
	C	4	1	3	1	Nil	Nil
	D	Nil	Nil	Nil	Nil	Nil	Nil
	E	5	4	1	1	2	1
	Total	14	9	5	3	3	3
Percentage Incidence during the Phase			64%	36%	21%	21%	21%
2nd Phase	B	5	5	Nil	Nil	Nil	5
	C	5	Nil	5	Nil	Nil	Nil
	D	Nil	Nil	Nil	Nil	Nil	Nil
	E	4	3	1	Nil	1	2
	Total	14	8	6	Nil	1	7
Percentage Incidence during the Phase			57%	43%	Nil	7%	50%
3rd Phase	B	5	5	Nil	Nil	Nil	5
	C	4	1	3	1	Nil	Nil
	D	Nil	Nil	Nil	Nil	Nil	Nil
	E	4	3	1	1	2	Nil
	Total	13	9	4	2	2	5
Percentage Incidence during the Phase			69%	31%	15%	15%	38%
Percentage Incidence in the Total Edentulous sample during the Exercise		41	63%	37%	12%	14%	36%

Table No. 84

Incidence of Cuspal Guidance in the three phases of M.C. ad. Lib. Exercise in Edentulous Subjects	Subject	Total number of cycles	Number of cycles showing Cuspal Guidance	Number of cycles showing No Cuspal Guidance	Number of cycles showing Cuspal Guidance only in the opening strokes	Number of cycles showing Cuspal Guidance only in the closing strokes	Number of cycles showing Cuspal Guidance in both strokes
1st Phase	B	5	5	Nil	Nil	1	4
	C	5	5	Nil	Nil	1	4
	D	6	Nil	6	Nil	Nil	Nil
	E	4	4	Nil	Nil	Nil	4
	Total	20	14	6	Nil	2	12
Percentage Incidence during the Phase			70%	30%	Nil	10%	60%
2nd Phase	B	5	5	Nil	Nil	Nil	5
	C	5	5	Nil	Nil	Nil	5
	D	5	Nil	5	Nil	Nil	Nil
	E	3	3	Nil	Nil	Nil	3
	Total	18	13	5	Nil	Nil	13
Percentage Incidence during the Phase			72%	28%	Nil	Nil	72%
3rd Phase	B	5	5	Nil	1	Nil	4
	C	4	4	Nil	Nil	Nil	4
	D	7	Nil	7	Nil	Nil	Nil
	E	4	4	Nil	Nil	1	3
	Total	20	13	7	1	1	11
Percentage Incidence during the Phase			65%	35%	5%	5%	55%
Percentage Incidence in the Total Edentulous sample during the Exercise			69%	31%	2%	5%	62%

Table No. 85

Incidence of Cuspal Guidance in the three phases of S.D.C. ad. Lib. Edentulous Subjects	Subject	Total number of cycles	Number of cycles showing Cuspal Guidance	Number of cycles showing No Cuspal Guidance	Number of cycles showing Cuspal Guidance only in the opening strokes	Number of cycles showing Cuspal Guidance only in the closing strokes	Number of cycles showing Cuspal Guidance in both strokes
1st Phase	B	5	5	Nil	Nil	1	4
	C	4	1	3	Nil	1	Nil
	D	5	2	3	1	1	Nil
	E	4	1	3	1	Nil	Nil
	Total	18	9	9	2	3	4
Percentage Incidence during the Phase			50%	50%	11%	17%	22%
2nd Phase	B	5	4	1	1	1	2
	C	5	2	3	1	Nil	1
	D	5	Nil	5	Nil	Nil	Nil
	E	4	4	Nil	Nil	Nil	4
	Total	19	10	9	2	1	7
Percentage Incidence during the Phase			53%	47%	11%	5%	37%
3rd Phase	B	5	5	Nil	Nil	Nil	5
	C	5	5	Nil	1	Nil	4
	D	4	Nil	4	Nil	Nil	Nil
	E	4	4	Nil	Nil	Nil	4
	Total	18	14	4	1	Nil	13
Percentsge Incidence during the Phase			78%	22%	6%	Nil	72%
Percentage Incidence in the Total Edentulous sample during the Exercise			60%	40%	9%	7%	44%

2. Incidence of Cuspal Guidance during the three phases of the four masticatory exercises in the Edentulous Subjects:-

Tables No. 82-85 display the incidence of cuspal guidance during the three phases of the four masticatory exercises performed by the edentulous subjects, the essential features being as under:-

(i) "P.C. ad lib." Exercise:- (Table No. 82)

Although a majority of the cycles showed cuspal guidance during the three phases of the exercise, the incidence was lower in the 1st Phase than in the 2nd and 3rd Phases. This relatively lower incidence in the 1st Phase was due to a greater number of cycles being executed vertically. During the 2nd Phase a much greater percentage of cycles showed cuspal guidance in both the opening and closing strokes.

(ii) "P.C.F.M. ad lib." Exercise:- (Table No. 83)

The incidence of cuspal guidance was highest during the 1st Phase and progressively decreased in the 2nd and 3rd Phases. During the 2nd Phase a greater number of cycles showed cuspal guidance in both the opening and closing strokes.

(iii)"M.C. ad lib." Exercise:- (Table No. 84)

The incidence of cuspal guidance was highest during the 2nd Phase and lowest during the 3rd Phase. All cycles in the 2nd Phase showed cuspal guidance during both the opening and closing strokes.

(iv) "S.D.C. ad lib." Exercise:- (Table No. 85)

The incidence of cuspal guidance was highest during the 3rd Phase. During this phase the incidence of cycles showing cuspal guidance in both the opening and closing strokes was also highest.

3. <u>The disposition of the types of Cuspal Guidance during the three phases of the masticatory exercises in the Edentulous Subjects</u>:- (Tables No. 86-89)

As was in the case of the Dentulous Subject two types of cuspal guidance i.e. point reflective cuspal guidance and sliding deflective cuspal guidance were seen. Both types occurred in opening as well as closing strokes and in frontal and sagittal views.

(i) "P.C. ad lib." Exercise:- (Table No. 86)

The incidence of point reflective cuspal guidance progressively increased as the mastication progressed from the 1st to the 3rd Phase. A majority of the opening strokes in the 1st Phase showed point reflective cuspal guidance while majority of the closing strokes during the 1st Phase showed sliding deflective cuspal guidance. A similar situation existed during 2nd Phase. In the 3rd Phase in both the opening and closing strokes the incidence of point reflective cuspal guidance was the highest.

(ii) "P.C.F.M. ad lib." Exercise:- (Table No. 87)

The incidence of point reflective and sliding deflective cuspal guidance was lowest during the 1st Phase. Most of the opening and closing strokes showed sliding deflective cuspal guidance. During the 2nd Phase most of the opening strokes showed point reflective cuspal guidance and most of the closing strokes showed sliding deflective guidance. During the 3rd Phase the incidence of sliding deflective cuspal guidance was highest and occurred in a majority of opening strokes.

(iii)"M.C. ad lib." Exercise:- (Table No.88)

The incidence of point reflective cuspal guidance

Table No. 86

Type of Cuspal Guidance during Three Phases of P.C. ad. lib.

Edentulous	Subject	No. of strokes X2	Incid. of C.G.	Cuspal Guidance in the Frontal view				Cuspal Guidance in the Sagittal view			
				Opening stroke		Closing stroke		Opening stroke		Closing stroke	
				Point C.G.	Sliding C.G.	Point C.G.	sliding C.G.	Point C.G.	Sliding C.G.	Point C.G.	Sliding C.G.
1st Phase	B	20	10	1	2	1	3	1	Nil	1	1
	C	16	13	1	3	1	3	Nil	2	Nil	3
	D	20	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	16	7	Nil	3	Nil	4	Nil	Nil	Nil	Nil
Total		72	30	2	8	2	10	1	2	1	4
Percentage Incidence during the Phase			42%	3%	11%	3%	14%	1%	3%	1%	6%
Point cuspal guidance incidence = 8% Sliding cuspal guidance incidence = 34%											
2nd Phase	B	20	15	5	Nil	5	Nil	1	Nil	1	3
	C	16	14	1	3	2	2	Nil	4	Nil	2
	D	20	1	Nil	Nil	Nil	1	Nil	Nil	Nil	Nil
	E	12	6	Nil	3	Nil	3	Nil	Nil	Nil	Nil
Total		68	36	6	6	7	6	1	4	1	5
Percentage Incidence during the Phase			53%	9%	9%	10%	9%	1%	6%	1%	7%
Point cuspal guidance incidence = 21% Sliding cuspal guidance incidence = 31%											
3rd Phase	B	20	17	5	Nil	5	Nil	1	1	2	3
	C	16	10	2	1	2	1	Nil	2	Nil	2
	D	20	4	1	2	1	Nil	Nil	Nil	Nil	Nil
	E	12	4	2	Nil	1	Nil	1	Nil	Nil	Nil
Total		68	35	10	3	9	1	2	3	2	5
Percentage Incidence during the Phase			51%	15%	4%	13%	1%	3%	4%	3%	7%
Point cuspal guidance incidence = 34% Sliding cuspal guidance incidence = 16%											
Percentage Incidence in The Total Edentulous sample during total performance of the Exercise		208	48%	9%	8%	9%	8%	2%	4%	2%	7%
Point cuspal guidance incidence = 22% Sliding cuspal guidance incidence = 27%											

Table No. 87

Type of Cuspal Guidance during Three Phases of P.C. F.M. ad lib.				Cuspal Guidance in the Frontal view				Cuspal Guidance in the Sagittal view			
				Opening stroke		Closing stroke		Opening stroke		Closing stroke	
Edentulous	Subject	No. of strokes X2	Incid. of C.G.	Point C.G.	Sliding C G.	Point C.G.	Sliding C.G	Point C.G	Sliding C.G.	Point C.G.	Sliding C.G.
1st Phase	B	20	7	Nil	2	Nil	1	1	Nil	2	1
	C	16	3	Nil	Nil	Nil	Nil	Nil	2	Nil	1
	D	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	20	5	1	1	1	2	Nil	Nil	Nil	Nil
Total		56	15	1	3	1	3	1	2	2	2
Percentage Incidence during the Phase			27%	2%	5%	2%	5%	2%	4%	4%	4%
Point cuspal guidance incidence = 10% Sliding cuspal guidance incidence = 18%											
2nd Phase	B	20	18	Nil	3	Nil	5	4	1	3	2
	C	20	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	D	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	16	5	1	1	2	Nil	Nil	Nil	Nil	1
Total		56	23	1	4	2	5	4	1	3	4
Percentage Incidence during the Phase			41%	2%	7%	4%	9%	7%	2%	5%	7%
Point cuspal guidance incidence = 18% Sliding cuspal guidance incidence = 25%											
3rd Phase	B	20	17	Nil	5	Nil	2	5	Nil	4	1
	C	16	1	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil
	D	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	16	4	Nil	1	Nil	2	Nil	Nil	1	Nil
Total		52	22	Nil	7	Nil	4	5	Nil	5	1
Percentage Incidence during the Phase			42%	Nil	13%	Nil	8%	10%	Nil	10%	2%
Point cuspal guidance incidence = 20% Sliding cuspal guidance incidence = 23%											
Percentage Incidence in The Total Edentulous sample during total performance of the Exercise		164	37%	1%	8%	2%	7%	6%	2%	6%	4%
Point cuspal guidance incidence = 15% Sliding cuspal guidance incidence = 21%											

Table No. 88

Type of Cuspal Guidance during Three Phases of M.C. ad. lib.				Cuspal Guidance in the Frontal view				Cuspal Guidance in the Sagittal view			
				Opening stroke		Closing stroke		Opening stroke		Closing stroke	
Edentulous	Subject	No. of strokes X2	Incid. of C.G.	Point C.G	Sliding C.G.	Point C.G.	Sliding C.G.	Point C.G.	Sliding C.G.	Point C.G.	Sliding C.G.
1st Phase	B	20	17	1	3	1	4	2	1	3	2
	C	20	17	2	2	2	2	2	2	3	2
	D	24	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	16	14	Nil	3	Nil	4	3	Nil	4	Nil
Total		80	48	3	8	3	10	7	3	10	4
Percentage Incidence during the Phase			60%	4%	10%	4%	13%	9%	4%	13%	5%
Point cuspal guidance incidence = 30% Sliding cuspal guidance incidence = 32%											
2nd Phase	B	20	15	Nil	5	Nil	1	Nil	4	Nil	5
	C	20	19	4	1	3	2	3	2	2	2
	D	20	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	12	10	Nil	3	Nil	3	2	Nil	2	Nil
Total		72	44	4	9	3	6	5	6	4	7
Percentage Incidence during the Phase			61%	6%	13%	4%	8%	7%	8%	6%	10%
Point cuspal guidance incidence =23% Sliding cuspal guidance incidence = 39%											
3rd Phase	B	20	14	1	3	Nil	1	1	3	1	4
	C	16	14	2	1	2	2	2	2	3	Nil
	D	28	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	16	13	Nil	2	Nil	4	3	Nil	2	2
Total		80	41	3	6	2	7	6	5	6	6
Percentage Incidence during the Phase			51%	4%	8%	3%	9%	8%	6%	8%	8%
Point cuspal guidance incidence = 23% Sliding cuspal guidance incidence = 31%											
Percentage Incidence in The Total Edentulous sample during total performance of the Exercise		232	57%	5%	10%	4%	10%	8%	6%	9%	8%
Point cuspal guidance incidence = 26% Sliding cuspal guidance incidence = 34%											

Table No. 89

Type of Cuspal Guidance during Three Phases of S.D.C. ad. lib.

Edentulous	Subject	No. of strokes X2	Incid. of C.G.	Cuspal Guidance in the Frontal view				Cuspal Guidance in the Sagittal view			
				Opening stroke		Closing stroke		Opening stroke		Closing stroke	
				Point C.G.	Sliding C.G.	Point C.G.	Sliding C.G.	Point C.G.	Sliding C.G.	Point C.G.	Sliding C.G.
1st Phase	B	20	10	2	1	2	3	1	Nil	1	Nil
	C	16	1	Nil	Nil	Nil	Nil	Nil	Nil	1	Nil
	D	20	2	Nil	1	Nil	1	Nil	Nil	Nil	Nil
	E	16	1	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil
Total		72	14	2	3	2	4	1	Nil	2	Nil
Percentage Incidence during the Phase			19%	3%	4%	3%	6%	1%	Nil	3%	Nil
Point cuspal guidance incidence = 10% Sliding cuspal guidance incidence = 10%											
2nd Phase	B	20	6	1	2	2	1	Nil	Nil	Nil	Nil
	C	20	5	1	Nil	1	Nil	2	Nil	1	Nil
	D	20	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	16	10	4	Nil	4	Nil	Nil	1	1	Nil
Total		76	21	6	2	7	1	2	1	2	Nil
Percentage Incidence during the Phase			28%	8%	3%	9%	1%	3%	1%	3%	Nil
Point cuspal guidance incidence = 23% Sliding cuspal guidance incidence = 5%											
3rd Phase	B	20	10	1	4	2	3	Nil	Nil	Nil	Nil
	C	20	9	Nil	Nil	Nil	Nil	4	1	4	Nil
	D	16	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	E	16	10	3	1	1	1	Nil	1	1	2
Total		72	29	4	5	3	4	4	2	5	2
Percentage Incidence during the Phase			40%	6%	7%	4%	6%	6%	3%	7%	3%
Point cuspal guidance incidence = 23% Sliding cuspal guidance incidence = 19%											
Percentage Incidence in The Total Edentulous sample during total performance of the Exercise			29%	6%	5%	5%	4%	3%	1%	4%	1%
Point cuspal guidance incidence = 18% Sliding cuspal guidance incidence = 11%											

was the highest during the 1st Phase and was most pronounced in the closing strokes. Sliding deflective cuspal guidance was highest during the 2nd Phase and was most pronounced in the opening strokes. Sliding deflective cuspal guidance during the closing strokes formed the dominant feature of the 3rd Phase.

(iv) "S.D.C. ad lib." Exercise:- (Table No. 89)

Point reflective cuspal guidance was the dominant feature of the exercise, and progressively increased as the exercise progressed and was most pronounced in the closing strokes.

III. Envelope of movement space used during Mastication of different foods by the Edentulous Subjects B, C, D, and E.

(Figs. 66-74, Tables No. 90-92)

The Envelopes of Movement Space (E.M.S.) used during the performance of the four Masticatory exercises i.e. "P.C. ad lib.", "P.C.F.M. ad lib.", "M.C. ad lib." and "S.D.C. ad lib." by the Edentulous Subjects were examined in a manner similar to that followed for the Dentulous Subject 'A'. The following observations were made:-

1. General Characteristics

a. The three views of the Envelopes of Movement Space (E.M.S.) used were generally more irregular in the Edentulous Subjects than in the Dentulous Subject 'A'. The irregularities were most evidence in the outline forms of the 1st Phases of the different masticatory sequences and particularly in the performances by subjects 'C' and 'D'.

In most of the sequences the outline forms became smoother and better contained in the 2nd and 3rd Phases. Most irregular outline forms were seen during the

performance of "S.D.C. ad lib," exercise. Subject 'B' (Fig. No. 73) was able to crush the hard sugar drop in the first closing stroke and the outline form of the E.M.S. became progressively smoother during the 2nd and 3rd Phases. Subject 'C' (Fig. No. 73) was able to achieve partial crushing during the last stroke of the 1st Phase, and in the 2nd and 3rd Phases, moved the Jaw in lateral sweeps in attempts to dislodge the jammed food from the occlusal surfaces. Subject 'D' (Fig. No. 74) could not crush the sugar drop at all. This is evident from the vertical distance from the intercuspal position at which most of the cycles were executed. In four cycles the jaw point reached closer to the intercuspal position but these cycles only proved to be attempts at a favourable repositioning of the food. The food was ultimately rejected uncrushed. In Subject 'E' (Fig. No. 74) the sugar drop was crushed during the 1st and 2nd Phases. The lateral sweeps in the 3rd Phase were attempts to clear the jammed food from the occlusal surfaces.

The smoothest outline forms were seen during "M.C. ad lib." exercise. The outlines showed a greater degree of lateral deviation in both right and left direction. These deviations occurred:

(i) In the same cycle as for Subject 'E'. The opening stroke during its descent further deviated towards its side of initiation, during midcourse it changed direction and converged towards the C.V.A., the maximal opening being located close to the C.V.A. The stroke crossed the C.V.A. to the opposite side and during the ascent deviated further laterally on the side. The closing stroke then taking a wide lateral sweep converged towards the C.V.A. as it approached its point of termination.

(ii) Also as cumulative effect of a few consecutive cycles like during the 2nd Phase in Subject 'C'. The opening strokes descended closer to the C.V.A., deviated laterally in a wide sweep, changed into a closing stroke that converged towards the C.V.A. with an even wider sweep. The next opening stroke again passed closer to the C.V.A., but the closing stroke showed a sweep in a different direction from that of the preceding closing stroke.

b. There was no definite evidence of a spatial selection for the performance of any particular phase of the different masticatory sequences in the four edentulous subjects. With the exception of Subject 'C', where there was a positive tendency for the envelope of movement space used to be located mostly anterior to the C.V.A., in the remaining three edentulous subjects most of the space used during the masticatory exercises was located posterior to the C.V.A. Similarly in 87% of the frontal outline forms of masticatory phases most of the space used was located on the right side (preferred side) of the C.V.A. In 64% of phase outline forms most of the space used was located on the right side and posterior to the C.V.A.

c. The vertical height of the E.M.S. during ad lib. masticatory exercises in the edentulous subjects shows considerable variations in respect to (i) individual subjects, (ii) particular masticatory exercises, and (iii) the different phases of mastication. These three features are displayed in Table No. 90. The average vertical height of E.M.S. for the total edentulous sample was measured as 10.64 mm. The variations in the vertical height of E.M.S. in the individual subjects is noteworthy because the size of the food bolus was

Table No. 90

Masticatory Exercise	Masticatory Phases	Subject B	Subject C	Subject D	Subject E	Mean values during the Phases
P.C. ad lib.	1st	13.0 mm	7.8 mm	9.8 mm	10.2 mm	10.2 mm
	2nd	11.5 mm	7.0 mm	8.0 mm	11.2 mm	9.43 mm
	3rd	11.5 mm	10.0 mm	10.2 mm	5.4 mm	9.28 mm
Total mean for the exercise for each subject		12.2 mm	8.5 mm	9.6 mm	9.2 mm	9.83 mm
P,C.F.M. ad lib.	1st	9.9 mm	7.2 mm	Not Recorded	10.5 mm	9.2 mm
	2nd	9.5 mm	7.5 mm	"	7.5 mm	8.17 mm
	3rd	10.2 mm	6.7 mm	"	10.5 mm	9.13 mm
Total mean for the exercise for each subject		9.87 mm	7.1 mm	"	9.5 mm	8.82 mm
M.C. ad lib.	1st	13.2 mm	6.8 mm	11.2 mm	15.2 mm	11.6 mm
	2nd	12.0 mm	9.8 mm	13.5 mm	15.0 mm	12.58 mm
	3rd	15.0 mm	8.8 mm	13.5 mm	14.2 mm	12.88 mm
Total mean for the exercise for each subject		13.40 mm	8.47 mm	12.73 mm	14.8 mm	12.35 mm
S.D.C. ad lib.	1st	12.2 mm	12.8 mm	13.0 mm	13.2 mm	12.80 mm
	2nd	10.8 mm	9.0 mm	13.0 mm	12.5 mm	11.33 mm
	3rd	10.2 mm	6.0 mm	12.5 mm	13.5 mm	10.55 mm
Total mean for the exercise for each subject		11.1 mm	9.27 mm	12.83 mm	13.07 mm	11.57 mm
Total mean performance for each subject		11.64 mm	8.34 mm	11.72 mm	11.64 mm	10.64 mm

kept constant for each subject during the particular exercises. The maximum and minimum vertical heights of E.M.S. were recorded in Subject 'E' during the 1st Phase of "M.C. ad lib." exercise and the 3rd Phase of "P.C. ad lib." exercise respectively.

With respect to the different foods, the maximum vertical height of E.M.S. was recorded during "M.C. ad lib." exercise, the average for the total edentulous sample being 12.35 mm., the next lower being "S.D.C. ad lib." exercise with an average for the total edentulous sample of 11.57 mm. "P.C. ad lib." had a total sample average of 9.83 mm. In spite of the fact that the size of the food bolus was largest during "P.C.F.M. ad lib." exercise it showed the least vertical height of E.M.S., the total edentulous sample average being 8.82 mm.

There does not appear to be any definite relationship between the vertical height of the E.M.S. and the different phases of the masticatory sequences. During "P.C. ad lib." and "S.D.C. ad lib." exercises there was a progressive decrease in the vertical height of the E.M.S. as the mastication progressed through the three phases of the sequences. During "M.C. ad lib." there was a progressive increase in the vertical height of E.M.S. During "P.C.F.M. ad lib." exercise the 2nd Phase showed the least vertical height and the 3rd Phase the maximum for the exercise. Similar patterns existed in the individual subjects during these exercises.

Table No. 91

The average distance of the occlusal end of the E.M.S. from the intercuspal position in the Edentulous Subjects during ad. Lib Masticatory exercises.

Subjects	P.C. ad. Lib	P.C.F.M. ad.Lib.	M.C. ad.Lib.	S.D.C. ad.Lib.	Mean total performance of the Subjects Subjects
'B'	0.01mm	0.mm	0.mm	0.12mm	0.03mm
'C'	0.28mm	1.22mm	0.02mm	1.6mm	0.78mm
'D'	1.1mm	not recorded	1.4mm	4.45mm	2.32mm
'E'	0.46mm	0.8mm	0.05mm	2.55mm	0.97mm
Mean distances for different exercises	0.12mm	0.51mm	0.37mm	2.18mm	1.03mm

Mean of the total edent-ulous sample

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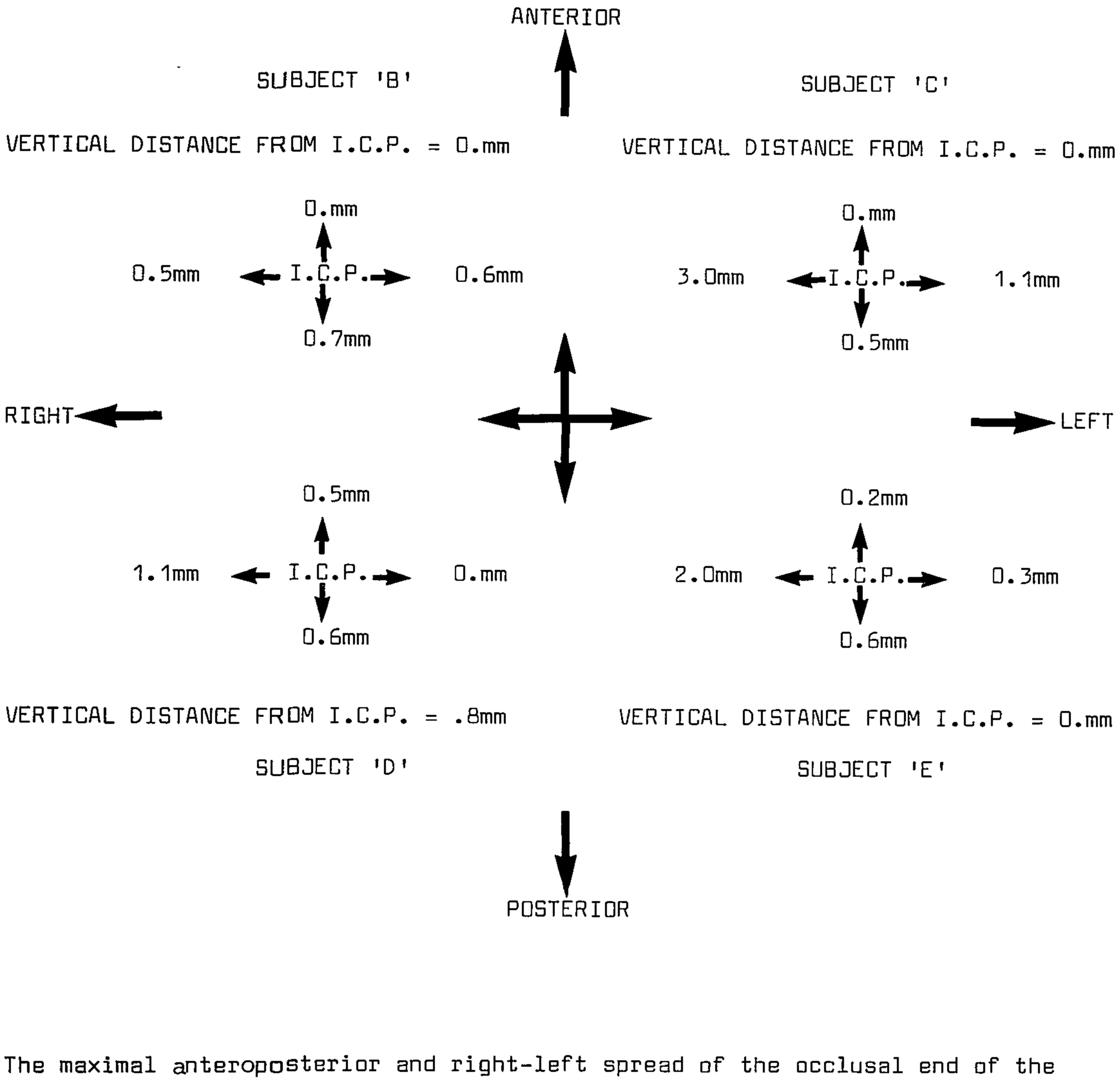
Table No. 92



The maximal anteroposterior and right-left spread of the occlusal end of the total E.M.S. used during the masticatory exercises in the four edentulous subjects 'B', 'C', 'D', and 'E'.

2. Location of the intercuspal position in relation to the E.M.S. used during ad lib. masticatory exercises in the edentulous subjects

In the total performance by the total edentulous sample, 39.5% of the opening and closing strokes initiated from and terminated in the closed mouth position, 60.3% strokes initiated from and terminated in open mouth positions, and only 8% actually initiated from or terminated in the intercuspal position. In Subject 'D' only the first cycle of each sequence initiated from the closed mouth or intercuspal position, all subsequent cycles initiated or terminated some distance below the intercuspal position.

Table No. 91 displays the average vertical distance of the occlusal ends of the E.M.S. from the intercuspal position during the four masticatory exercises in the four edentulous subjects. The vertical distance indicates the extent of penetration of food. The maximum penetration was attained in the "P.C. ad lib." exercise. The exercise "S.D.C. ad lib." showed the minimal penetration. The table also shows the mean penetration during the total performance in the individual subjects. Subject 'B' shows the maximum penetration of food and Subject 'D' the minimum.

Table No. 92 shows the maximum antero-posterior and lateral dimensions of the occlusal ends of the E.M.S. in the four subjects. In Subjects 'B', 'C', and 'E' the jaw point was able to reach the closed mouth position some distance away from the intercuspal position antero-posteriorly as well as laterally. In Subject 'D' the jaw could not penetrate the food completely at any time, so the occlusal end of the total envelope of E.M.S. was located .8 mm. below the intercuspal position.

APPENDIX III

ILLUSTRATIONS

FIGURE 1*

The position of a body ABC in space can be designated by describing the positions of the points A, B, and C using the Cartesian co-ordinates A_X, A_Y, A_Z, B_X, B_Y, B_Z, and C_X, C_Y, C_Z, with reference to the three planes XOY, XOZ and YOX. Four of the nine co-ordinates used here contain redundant positional information.

FIGURE 2*

The position of a body ABC in space can be designated by using only six "elements" of information, provided these "elements" contain the appropriate positional information. Thus the position of point A can be described by the Cartesian co-ordinates A_X, A_Y, A_Z, as in Fig. 1. But with the location of point A fixed, B must lie on the surface of a sphere which has AB as its radius, and the location of point B can be fully described by Cartesian co-ordinates B_X and B_Y. With the location of both A and B fixed, C must lie on the circumference of a circle axial to line AB with a radius CP (where P is the foot of a perpendicular dropped from C to line AB). The location of point C can now be described by the angle CP makes with any appropriate reference plane. This angle, here designated θ, is a polar co-ordinate.

FIGURE 3*

AB_L, AB_R, CD_U, CD_D are photocell "groups". Three photocells, connected in series, constitute each "group". If the photocells are suitably matched and connected in a "set", as shown, the AB_R AB_L photocell "set" output, as recorded by the pen writing assembly of a D.C. amplifier, will be zero no matter where a light source is positioned along line AB. Similarly, zero output will be recorded from the CD_U CD_D photocell "set" if the light source is positioned anywhere along line CD. If both outputs are zero, the light source must be located at X. Two other photocell "groups", located symmetrically above and below the plane of the paper, would permit the three dimensional location of point X in space, rather than the two-dimensional location demonstrated here.

*Adapted from Gillings [17], with his kind permission.

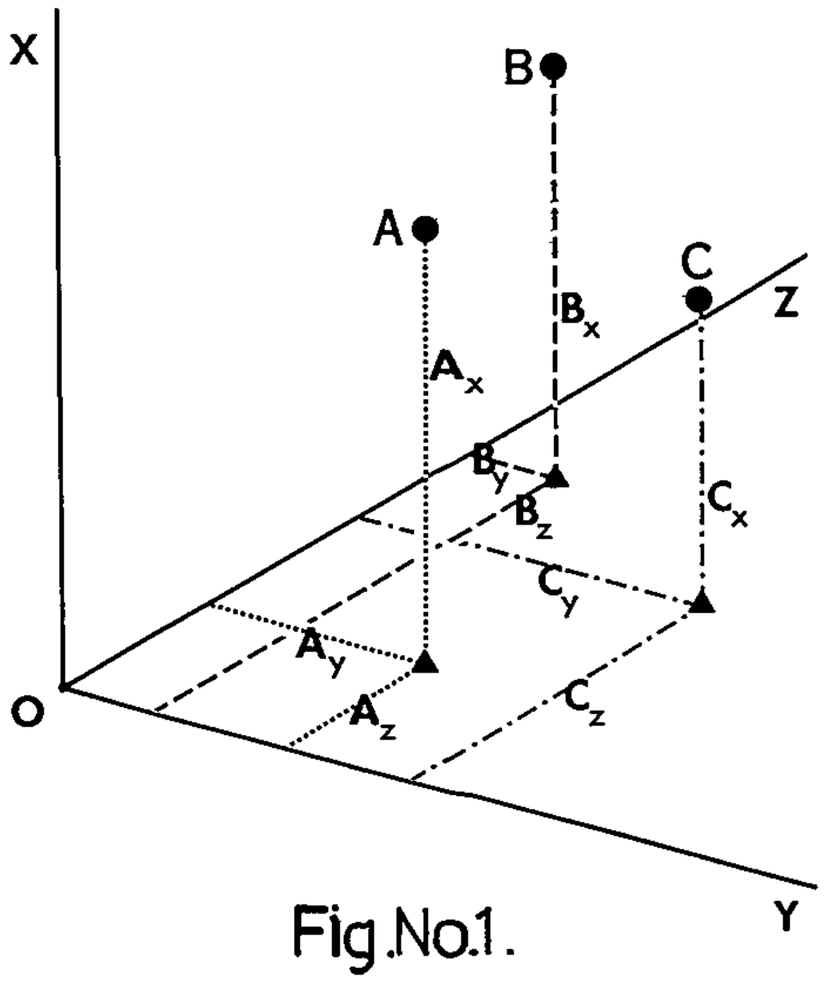


Fig.No.1.

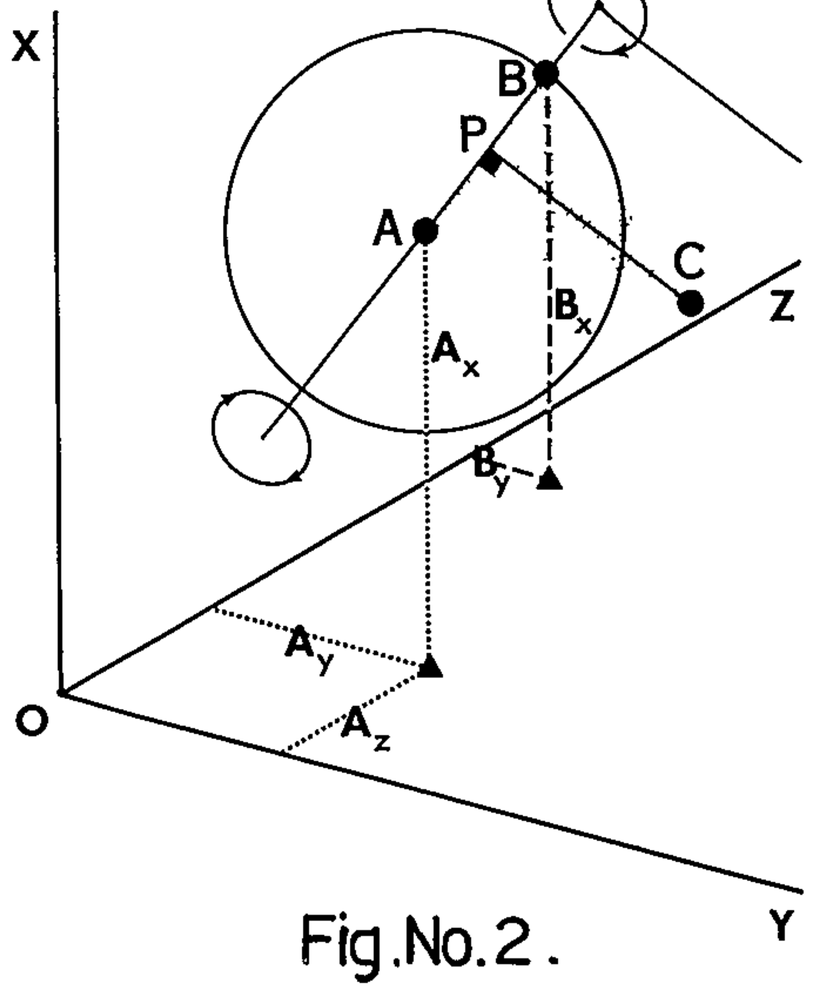


Fig.No.2.

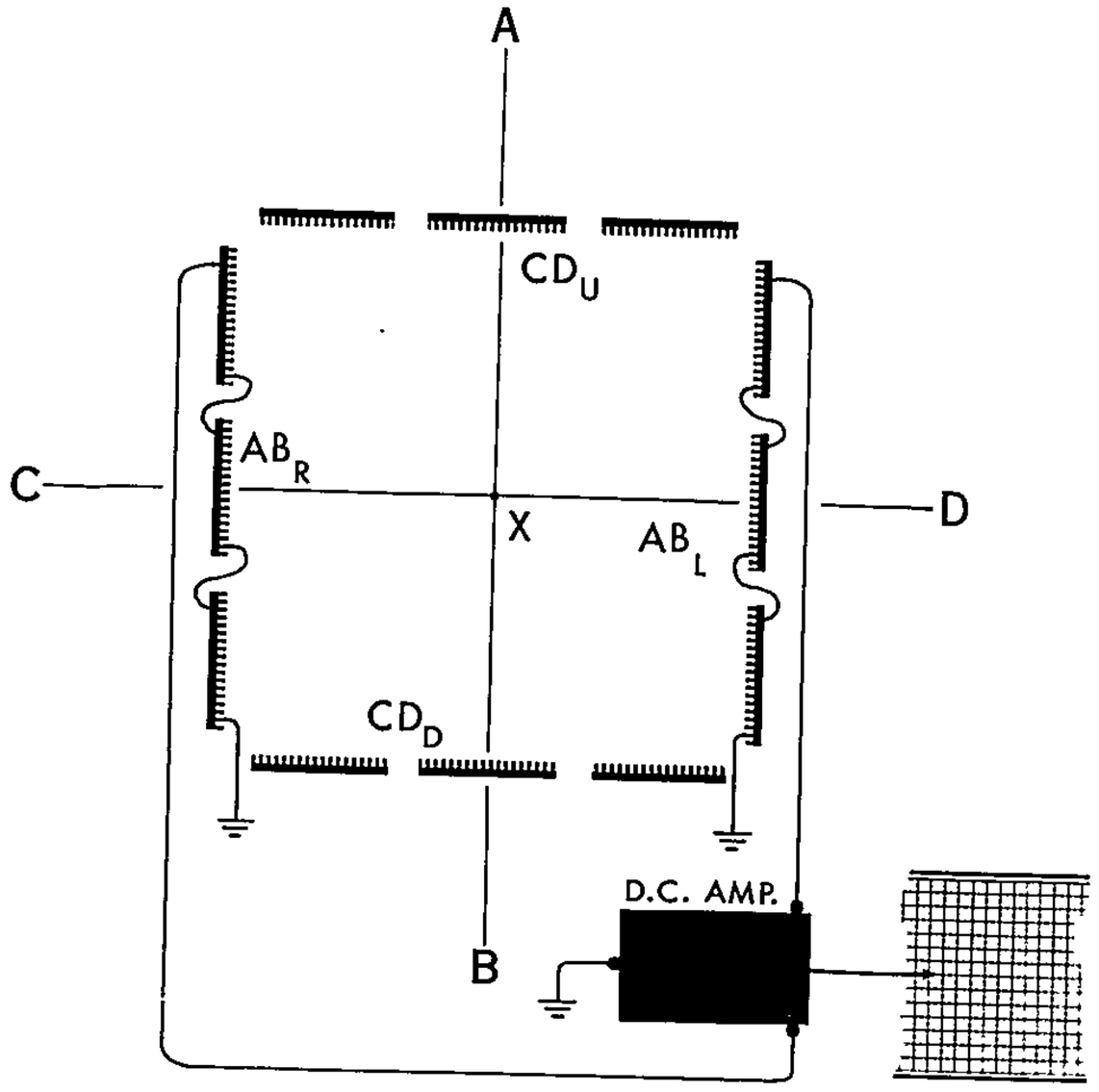


Fig.No.3.

FIGURE 4

If a light source is positioned at X, between two matched photocell "groups" AB_R and AB_L, the pen recorder of a D.C. amplifier connected as shown will trace the straight line labeled 1 on the moving recording paper. Movement of the light source from X to Y will increase the AB_R photocell "group" output and decrease the AB_L photocell "group" output, causing the pen to deflect from point X_P to Y_P and trace the line 1-2 on the moving recorder paper. The shape of line 1-2 will depend on the velocity of the light source movement from X to Y, and the speed of the recording paper.

FIGURE 5

The photocell frame, showing the three individual photocells making up each photocell "group" for the up-down and left-right photocell "set". The anterior-posterior photocell "set" is obscured by a photocell mounting plate. The light but rigid stainless steel wire frame is attached to the headframe by two adjustable rods and a universal joint. The photocell "set" wiring is led to a miniature multiple connector socket, which mates with a plug carrying the wires to the recording and power supply section of the apparatus.

Adapted from Gillings [17], with his kind permission.

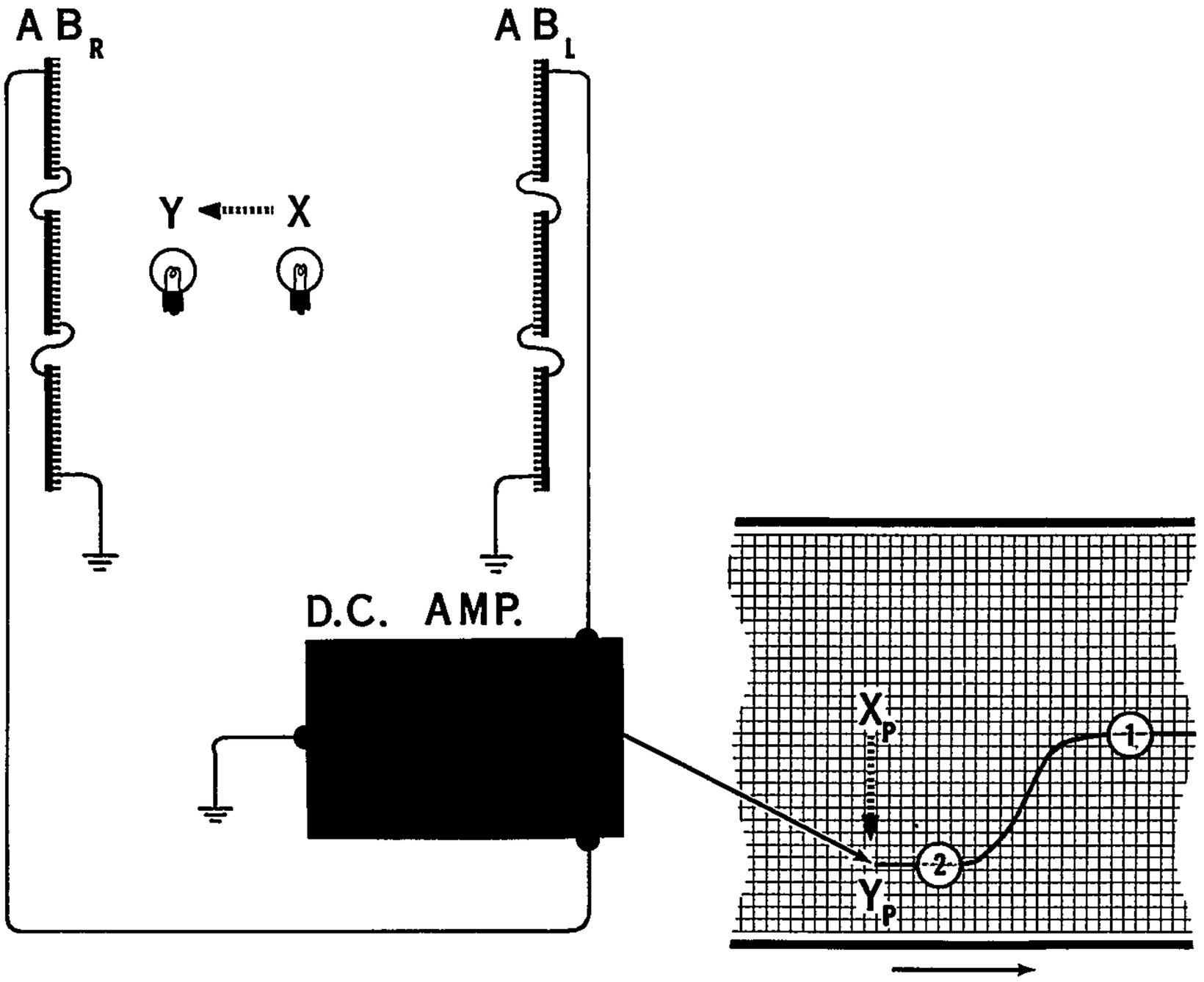


Fig.No.4 .

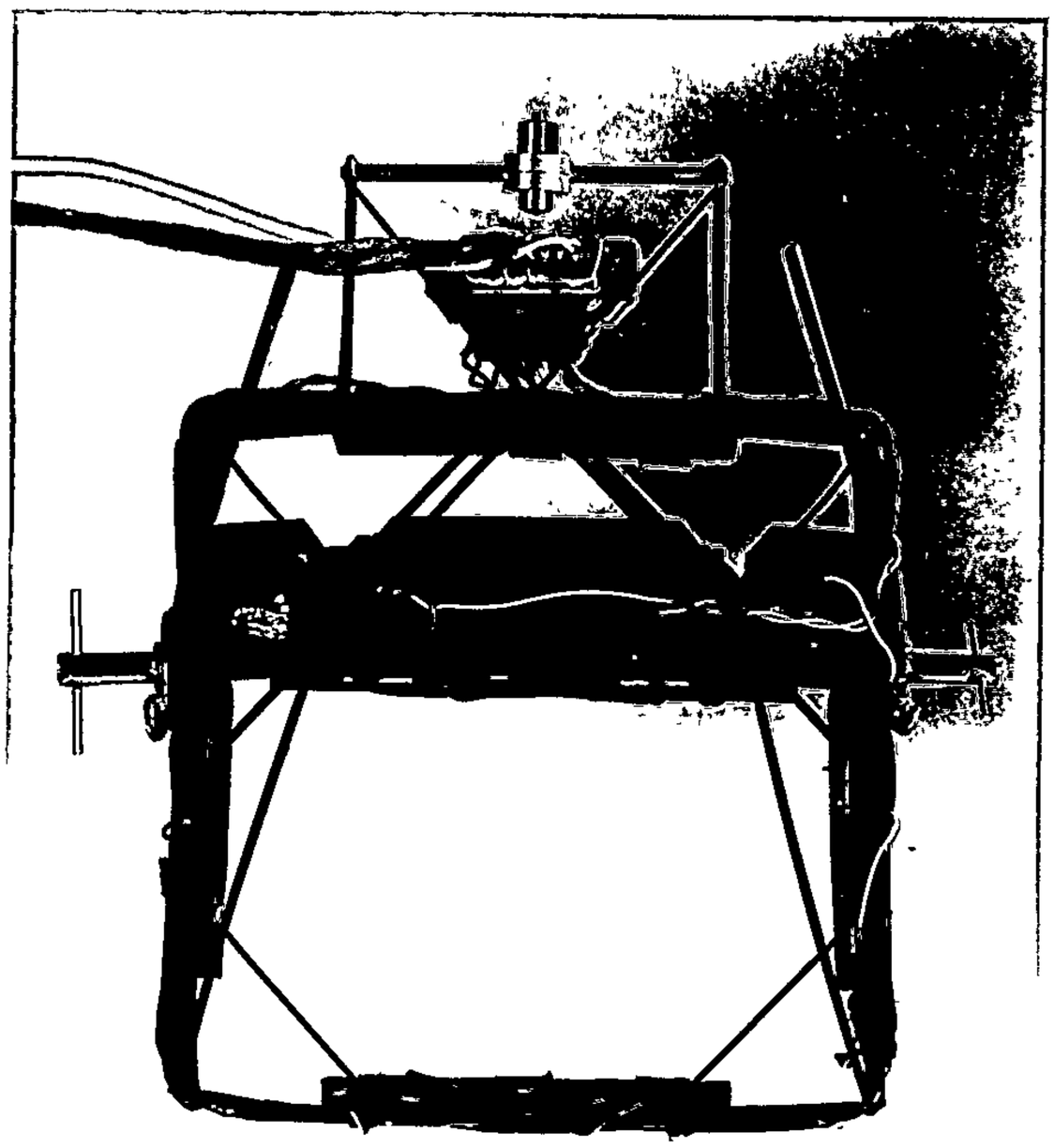


Fig.No.5 .

FIGURE 6

The photocell groups monitoring the motion in anterior-posterior direction were arranged in the form of two rectangles, one anteriorly and the other posteriorly. The anterior-posterior movements could be monitored with much greater accuracy and over a much greater range.

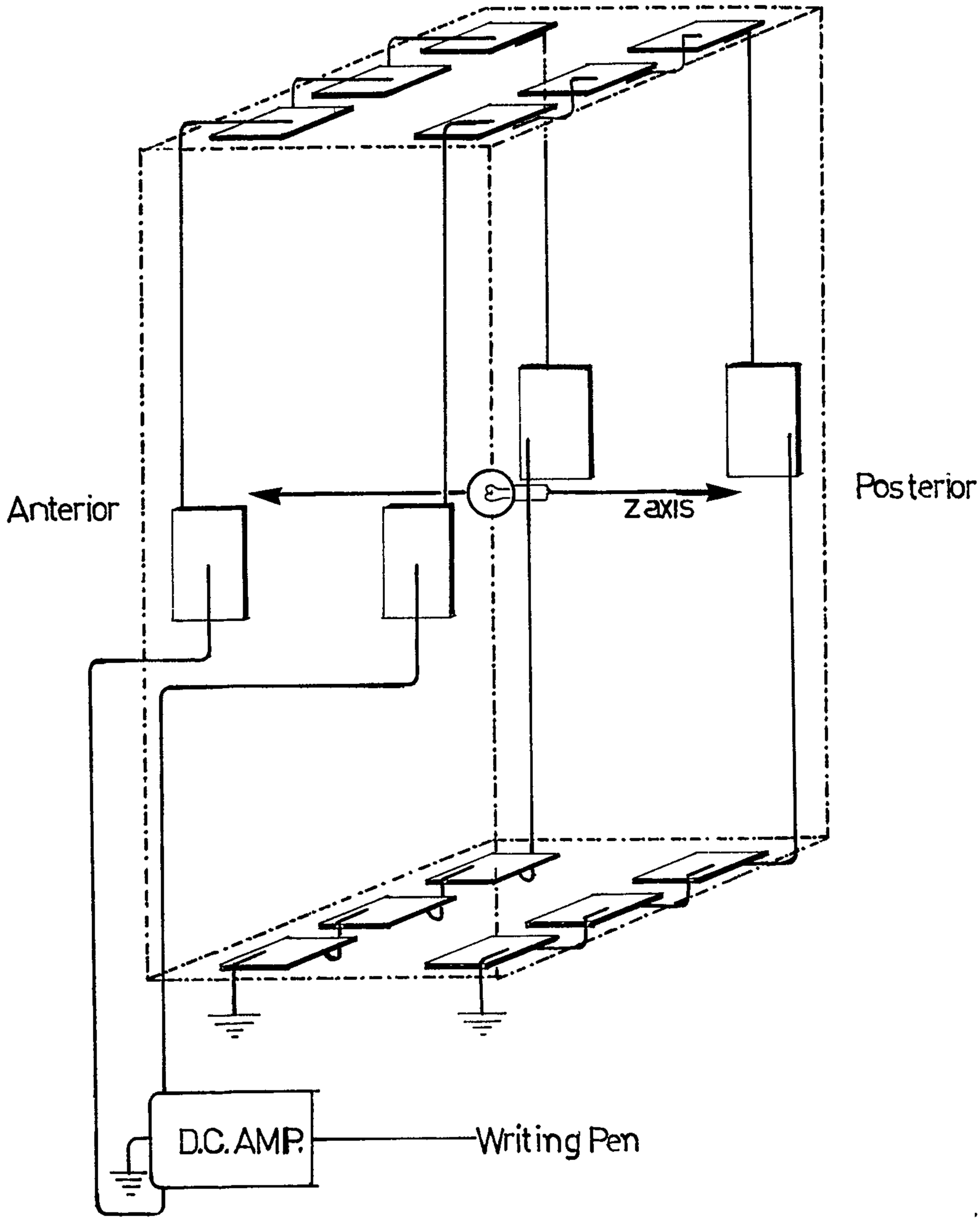


Fig.No.6.

FIGURE 7

Photocell Frame: 5½" x 4½" rectangular frame of light weight stainless steel tubing. The 28 photocells cemented on a thin acrylic rectangular frame fitted into the stainless steel frame.

'a' Eight of the twelve cells for monitoring the anterior-posterior movements.

'b' Four of the eight cells for monitoring the up-down movements.

'c' The eight photocells for monitoring the Right-Left movements.

'd' The multi-channel plug for connections with recording devices.

'e' One of the universal joints for suspension of the frame from the Head frame.

'f' Rods for three point suspension of the photocell frame.

'g' Sleeves for the remounting guide.

'h' Electrical connection for the mandibular light.

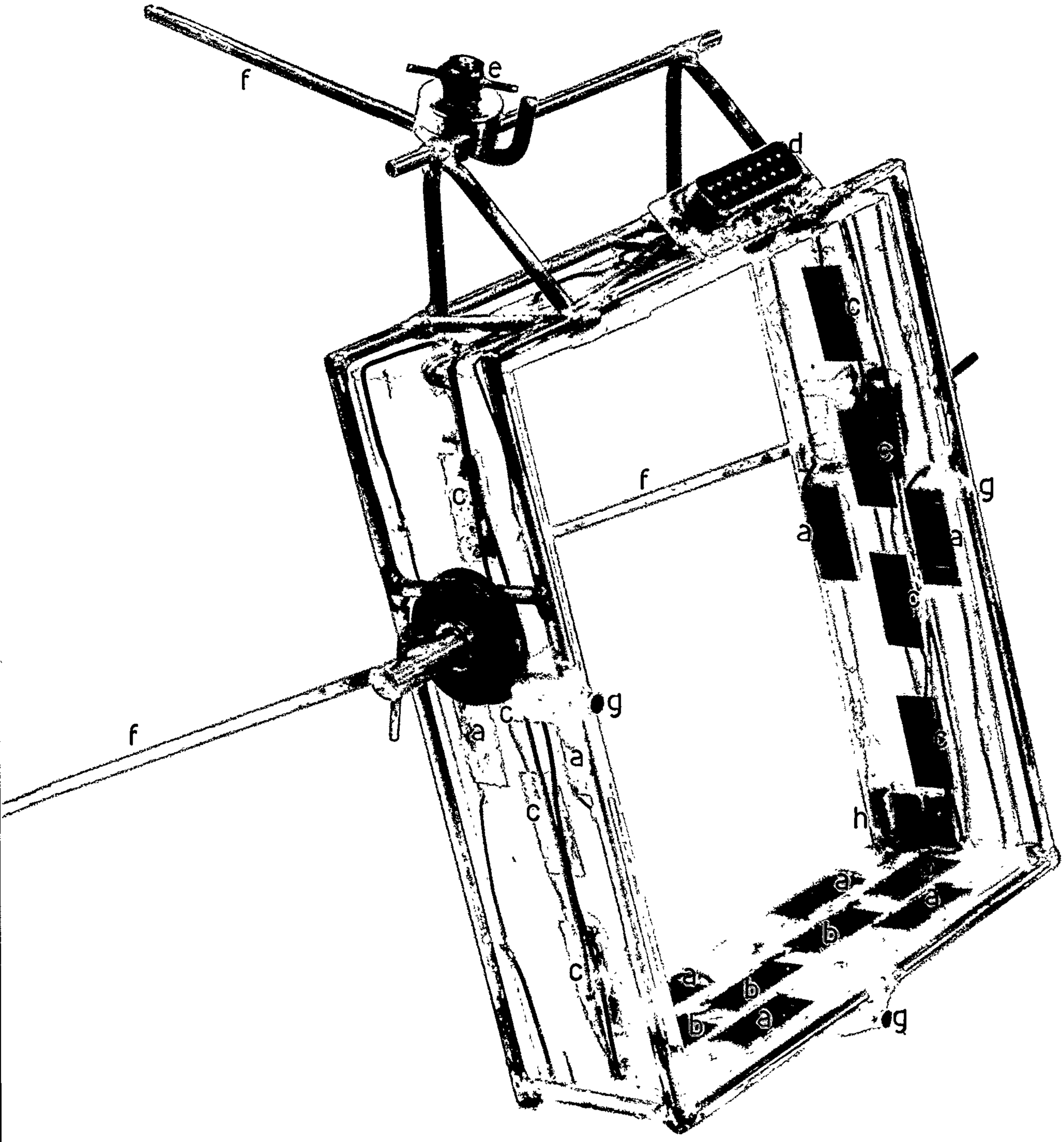


Fig. No. 7.

FIGURE 8

Head Frame consists of a. The anterior bow, b. the parietal support, c. The occipital cap.

FIGURE 9

a. Upper Denture with the tracing table of the central bearing device.

b. Mandibular light assembly in position on the lower denture.

c. The central bearing screw: it can be fixed to the lingual surfaces of the lower denture with a little sticky wax.

d. Power plug for the light. This can be plugged into the power point on the side of the photocell frame.

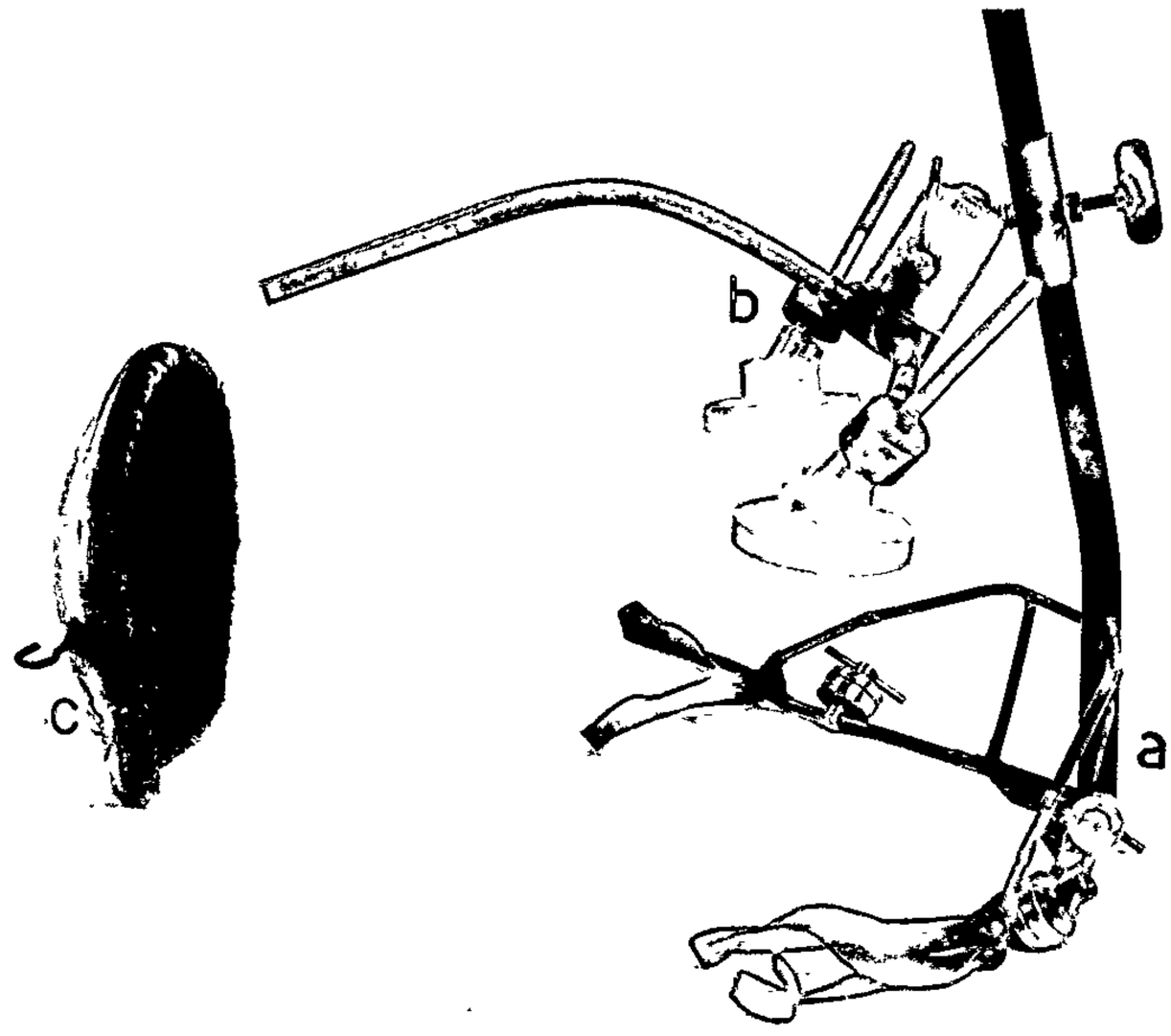


Fig.No.8.

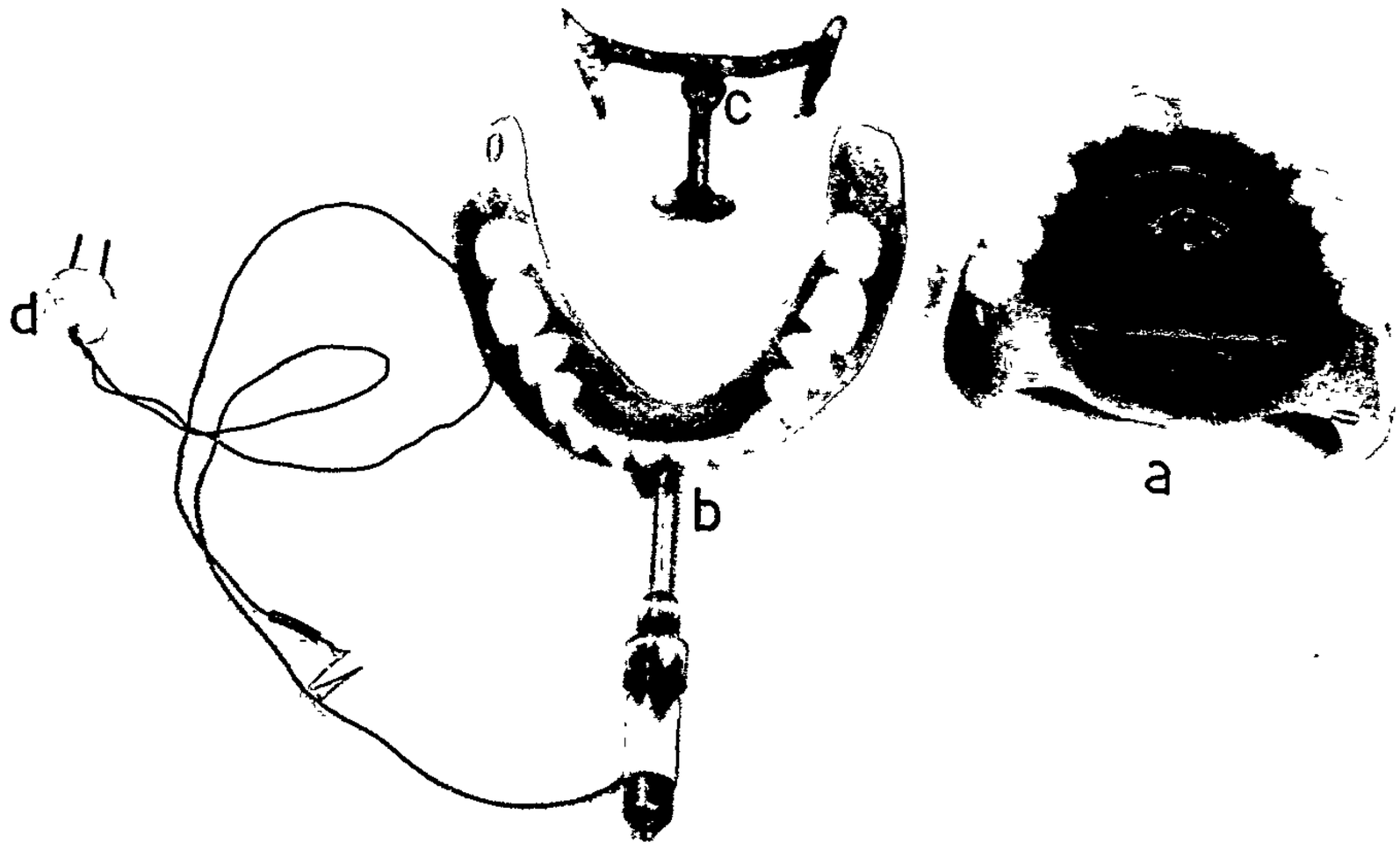


Fig.No.9.

FIGURE 10

Mandibular light assembly.

A. Light globe, a Philips 6V. 3W frosted festoon globe with axial filament.

B. The acrylic holder and brass tubing. The tubing slips on to the entire length of the Light rod C anchored between the central incisors on the lower denture. The holder maintains a constant distance of 45 mm. between the centre of the light globe and the labial surfaces of the teeth. The complete light assembly weighs only 6.0 gms.

Mandibular Light Assembly.

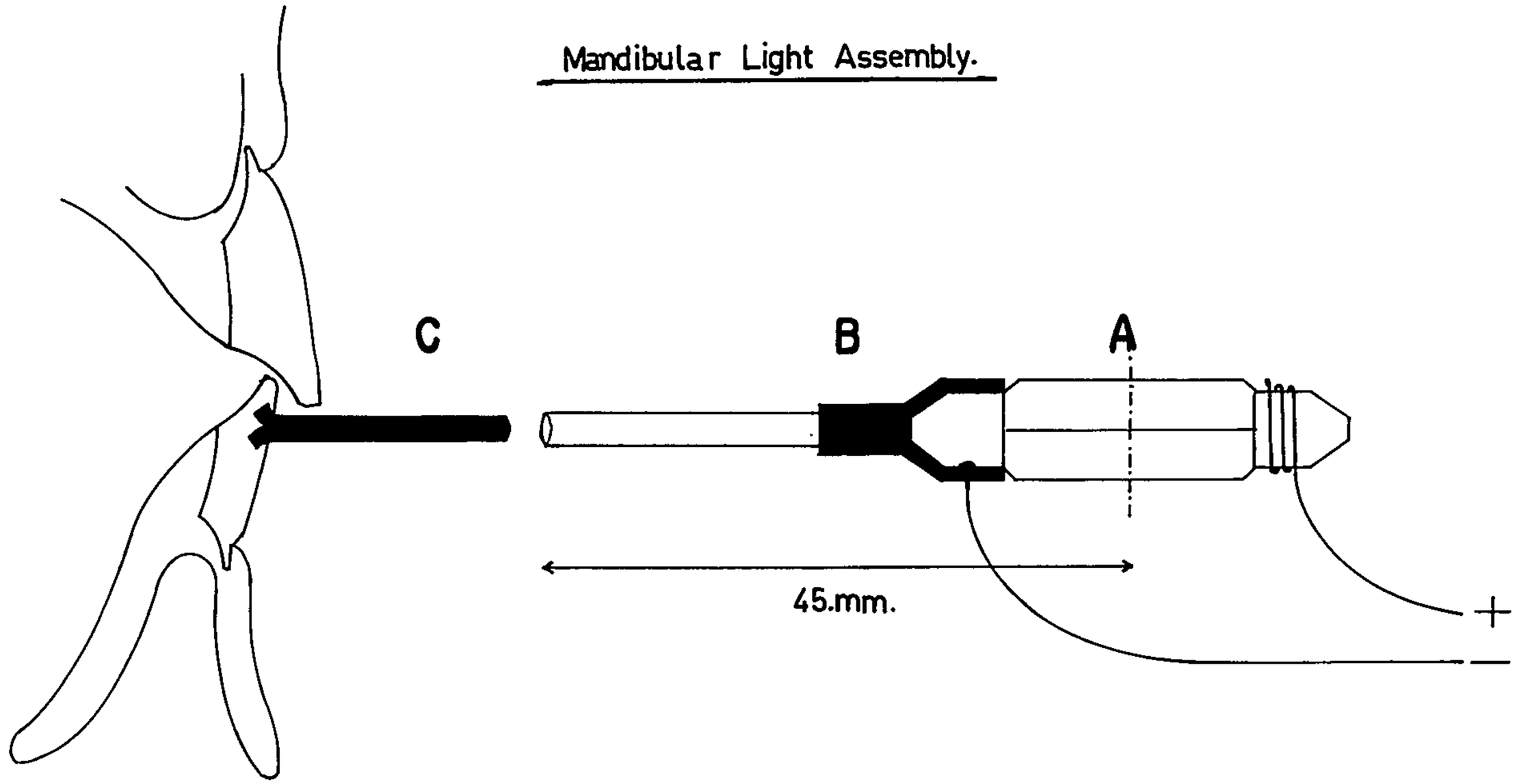


Fig.No.10.

FIGURE 11A

a. Remounting guide used to align the photocell frame in a standard relation to the Mandibular light and the base of the skull. Fig. No. 18 displays the remounting guide in use.

b. 10 mm. prop used to open the mouth a measured distance to facilitate calibration of the Up-Down recording device.

FIGURE 11B

The Fronto-Nasal Shield of moulded acrylic covering the forehead and the bridge of the nose. Fig. No. 17 shows the Fronto-Nasal Shield in position on a subject.

FIGURE 11C

Stainless steel tracing table that is fitted into the palatal space in the upper denture. (Fig. No. 9a). The table is covered with blue wax and shows the gothic arch tracing in an edentulous subject. The sides of the tracing pass anteriorly to the maximally retruded position. The illustration also shows the pits made in the plate with a No. 1 Round bur at 5 mm. distance from the apex of the gothic arch tracing, one in the middle and one on each of the lateral sides of the tracing. The central bearing screw when located on these pits, indicated a measured protrusive or lateral excursion of the jaw point and the recording devices could be calibrated accurately.

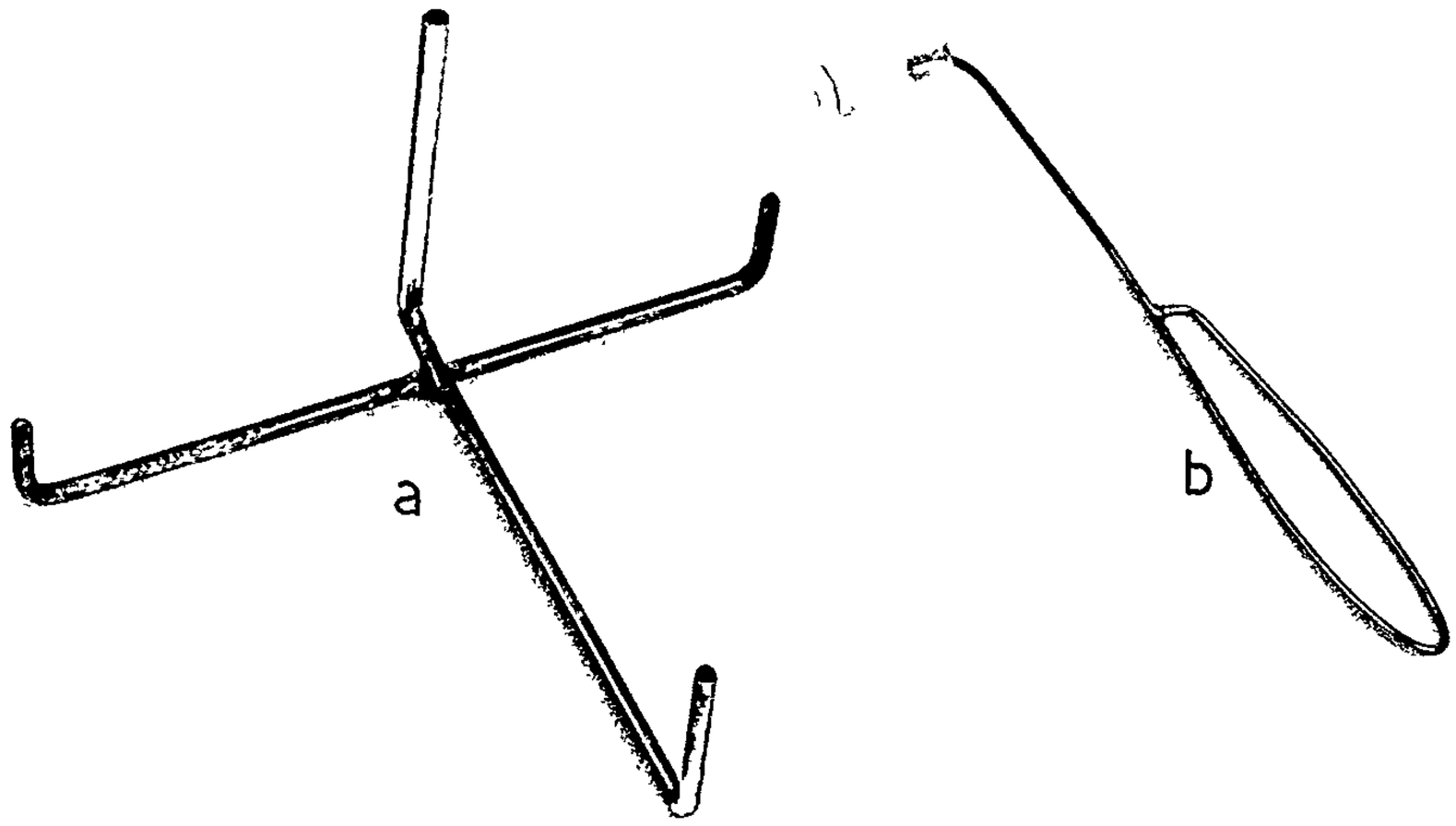


Fig. No.11A

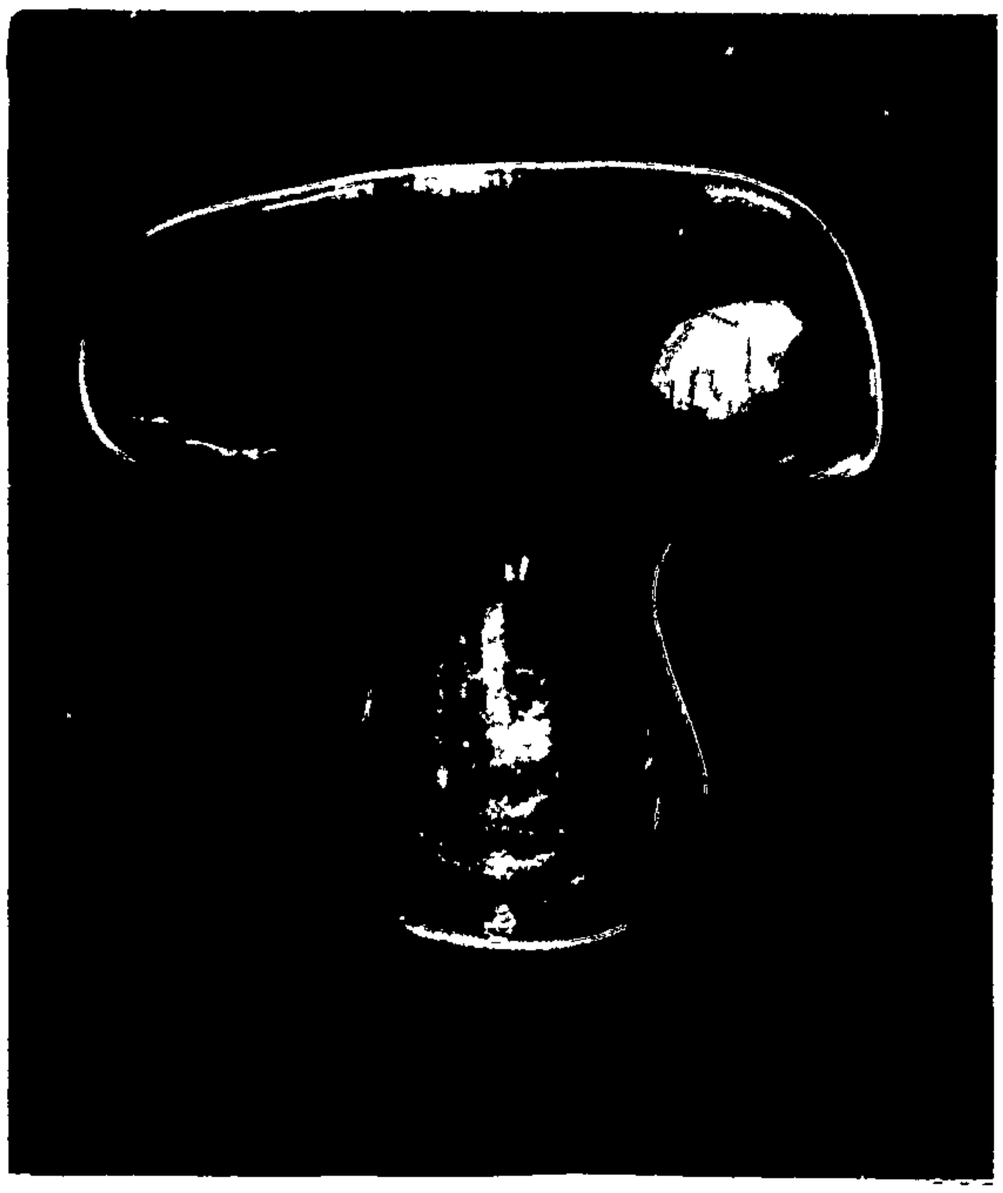


Fig.No.11B

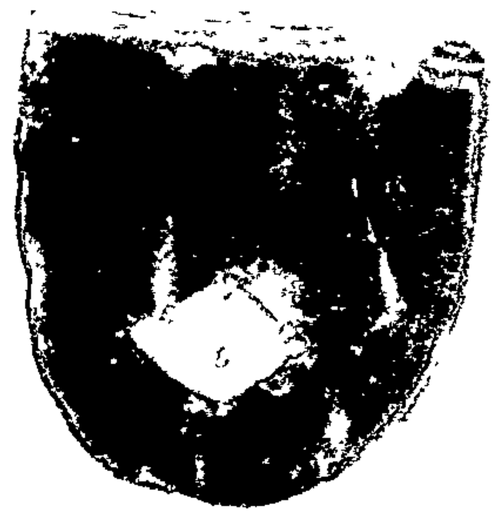


Fig.No.11C

FIGURE 12

Recording Devices:

a. Sanborn four track recorder

b. Dual beam storage oscilloscope.

FIGURE 13

Travelling stage microscope set up for verification of the linearity of movements as monitored by the photocell frame.

The microscope 'a' was laid on its side and in place of the eye piece, the mandibular light was mounted 'b'. The Photocell frame 'c' was secured in proper relation to the light in a suitable stand 'd'.

By this set up the entire space within the confines of the photocell frame could be scanned with the light and the movements monitored on the storage oscilloscope.

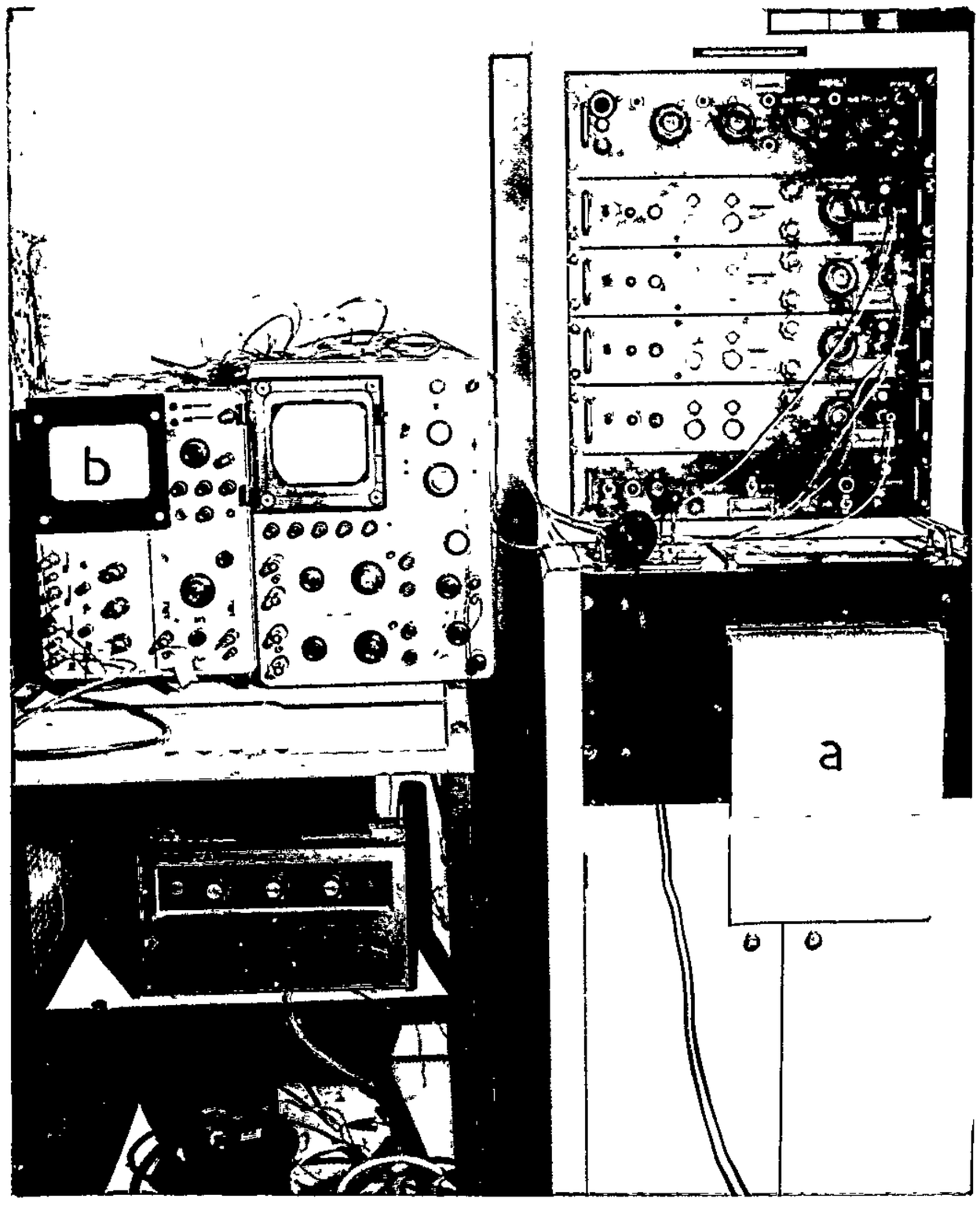


Fig.No.12.

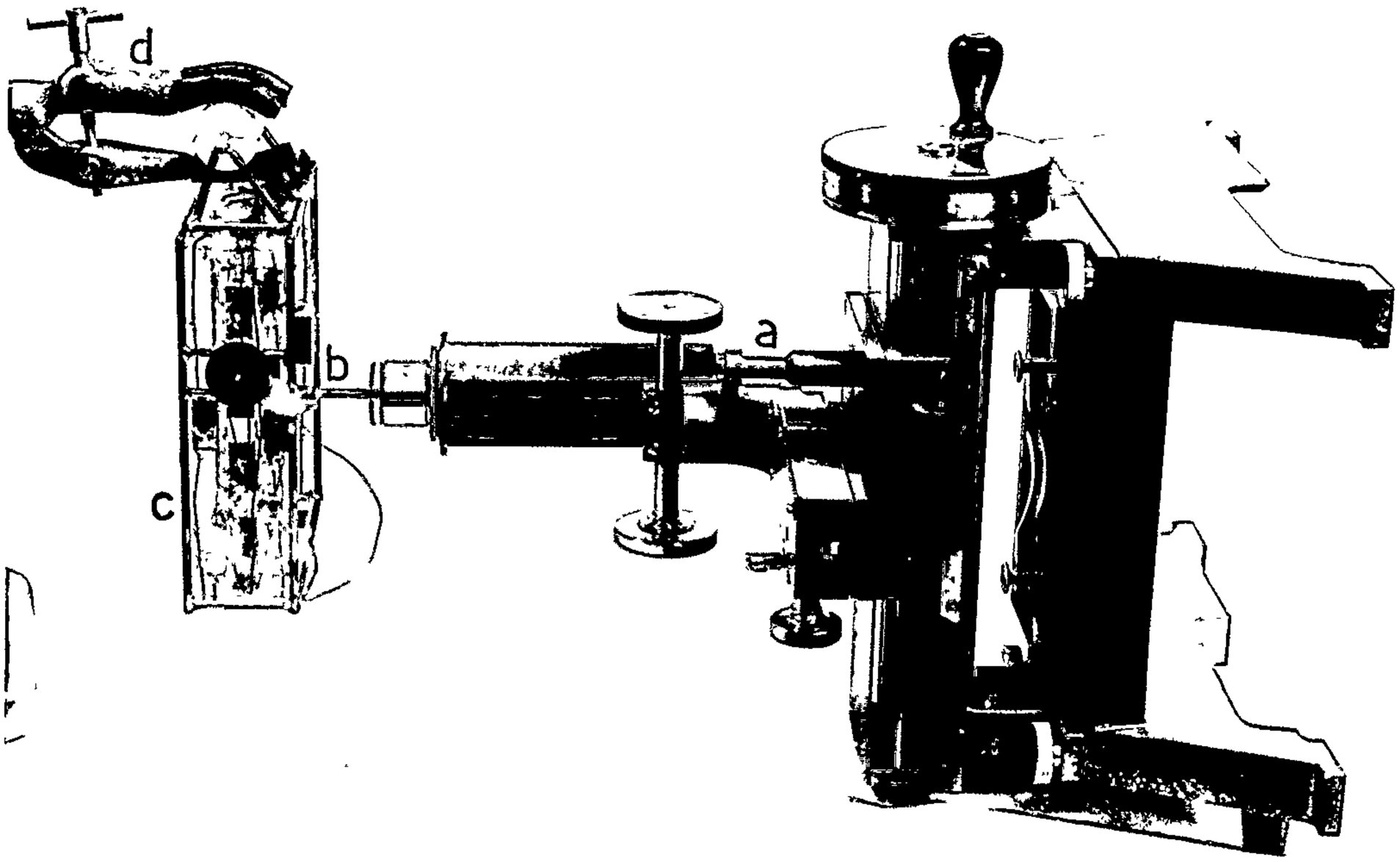
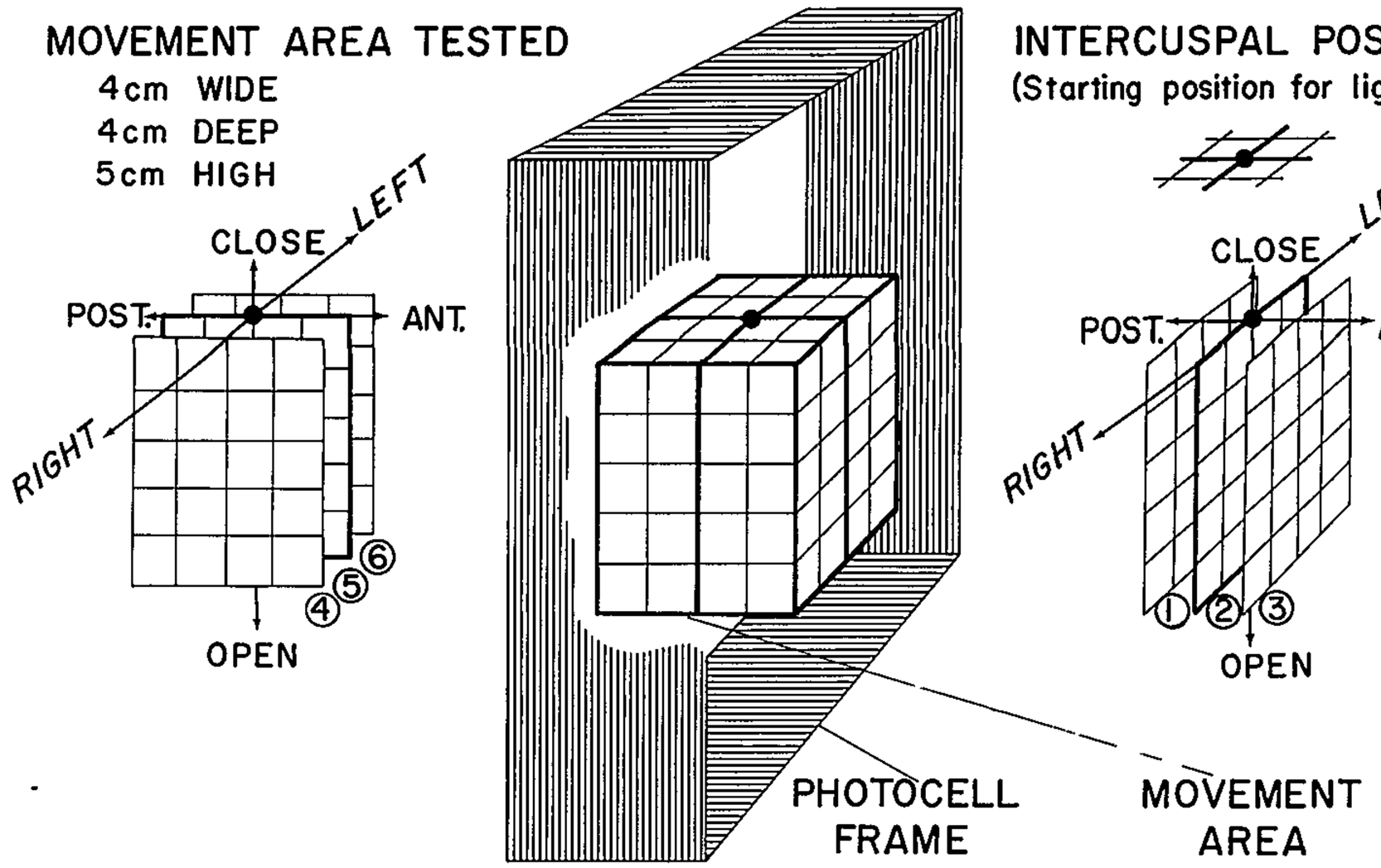


Fig.No.13.

FIGURE 14

Diagrammatic representation of the space tested for linearity. The six planes examined were: Three frontal planes. (1) One centimeter posterior to the C.V.A. (2) passing through the C.V.A. (3) One centimeter anterior to the C.V.A. The three sagittal planes, (4) One centimeter to the right of C.V.A. (5) Along the C.V.A., and (6) One centimeter to the left of the C.V.A. The location of the X, Y and Z axes in relation to the space is also indicated.

PHOTOCELL FRAME LINEARITY TEST



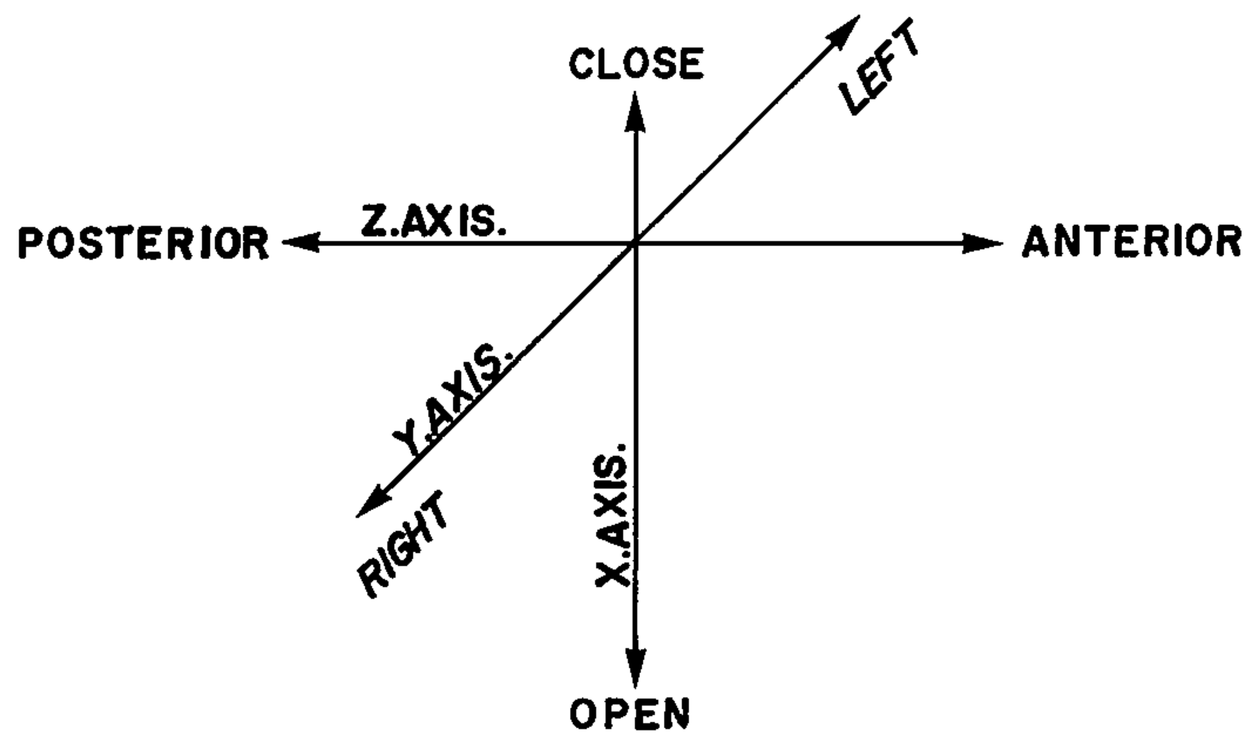


Fig.No. 14 .

FIGURE 15

Oscilloscope displays of the grids No. 1 to 6 as shown in Fig. No. 14. The spots indicate the positions of the mandibular light at the different steps during the scanning of the space shown in Fig. No. 14. The degree of loss of directional linearity can be estimated from the directional distortion of the rows of spots compared to the grid lines.

PHOTOCELL FRAME LINEARITY OSCILLOSCOPE DISPLAY

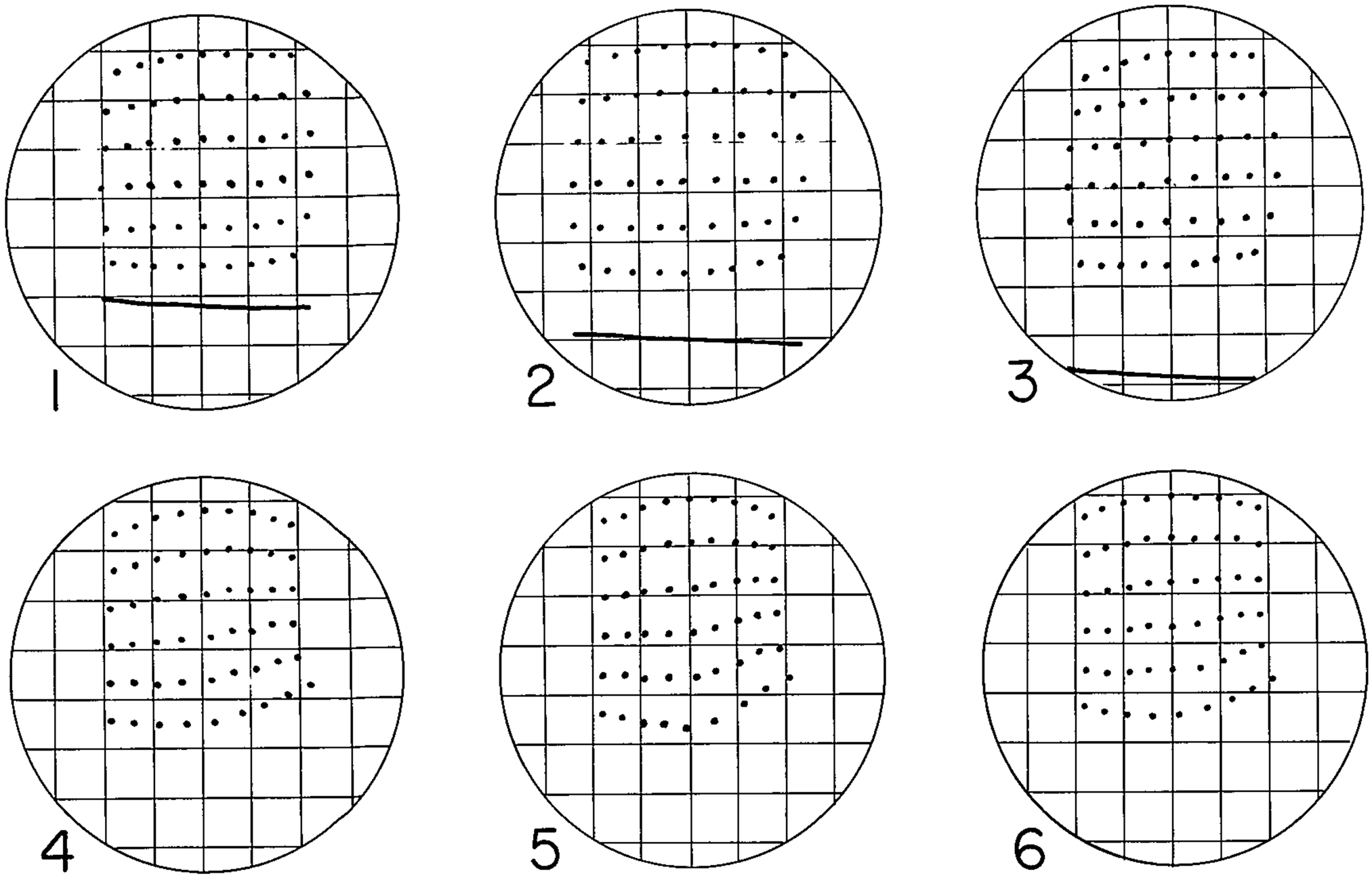


Fig.No.15.

FIGURE 16

Diagrammatic representation of Grids No. 2 and 5, showing the percentage discrepancy in the Dimensional linearity in movements as monitored by the photocell frame. The distances monitored by the photocell frame were compared to the distances actually travelled by the mandibular light through the graduated movements of the microscope stage and interpreted as percentage loss of dimensional linearity. (Figs. No. 13 to 15)

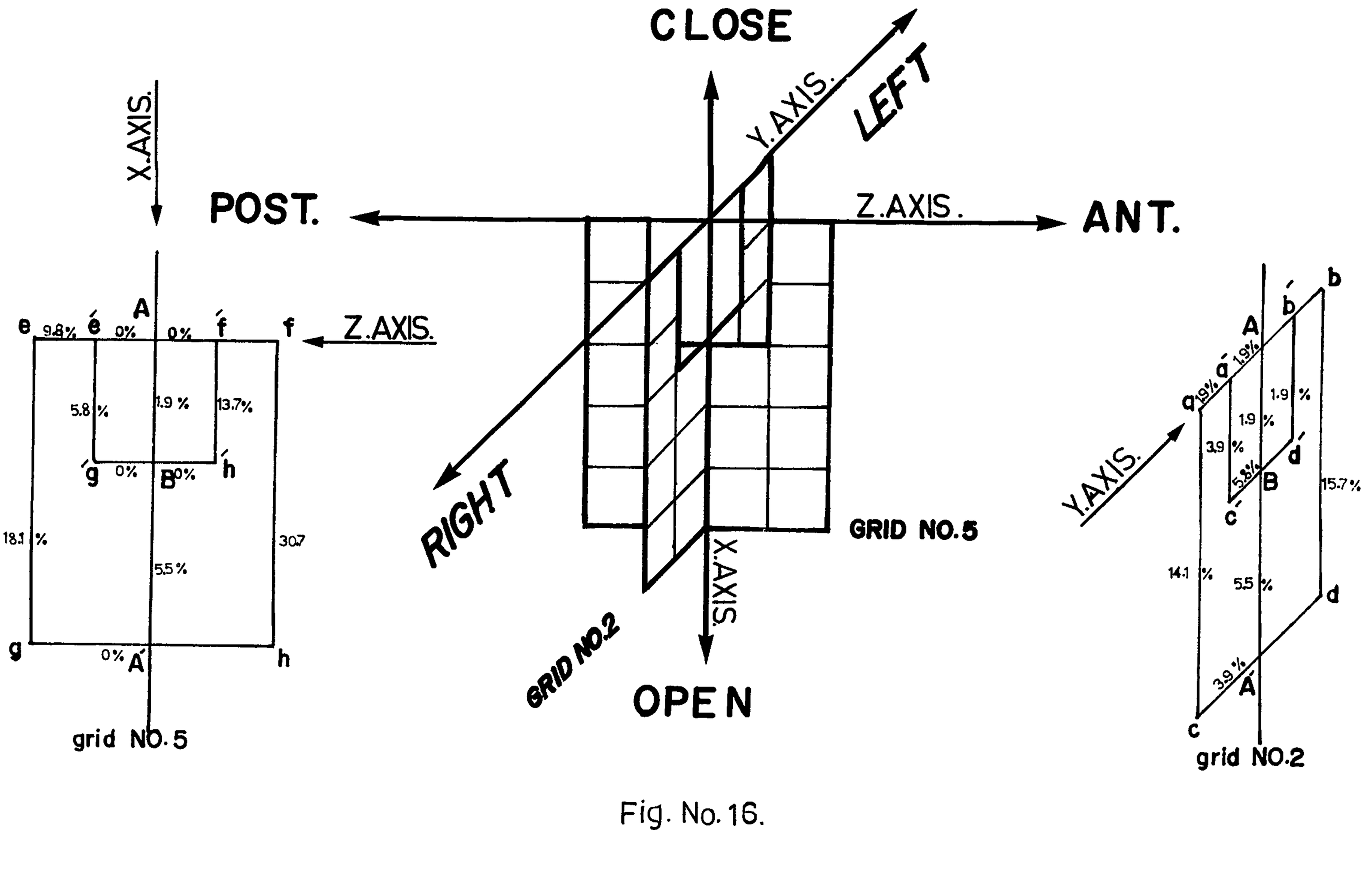

CLOSE
Y.AXIS.
LEFT
X.AXIS.
POST.
Z.AXIS.
ANT.
Z.AXIS.
RIGHT
GRID NO.5
X.AXIS.
GRID NO.2
OPEN
e
9.8%
é
0%
A
0%
f
f
5.8 %
1.9 %
13.7%
g
0%
B
0%
h
18.1 %
30.7
5.5 %
g
0%
A
h
grid NO. 5
b
b
A
a
1.9%
a
1.9%
1.9 %
1.9 %
3.9 %
d
5.6%
B
15.7 %
c
14.1 %
5.5 %
d
3.9 %
A
c
Y.AXIS.
grid NO.2

Fig. No. 16.

661K

FIGURE 17

Subject prepared for simultaneous eletromyographic and mandibulographic examination. Surface eletrodes were used on Anterior temporalis, Masseter and Digastric muscles on both sides. Note the position of the Fronto-Nasal Shield and the mandibular light.

FIGURE 18

The photocell frame is being aligned in position with the help of the remounting guide.

Fig.No.17.

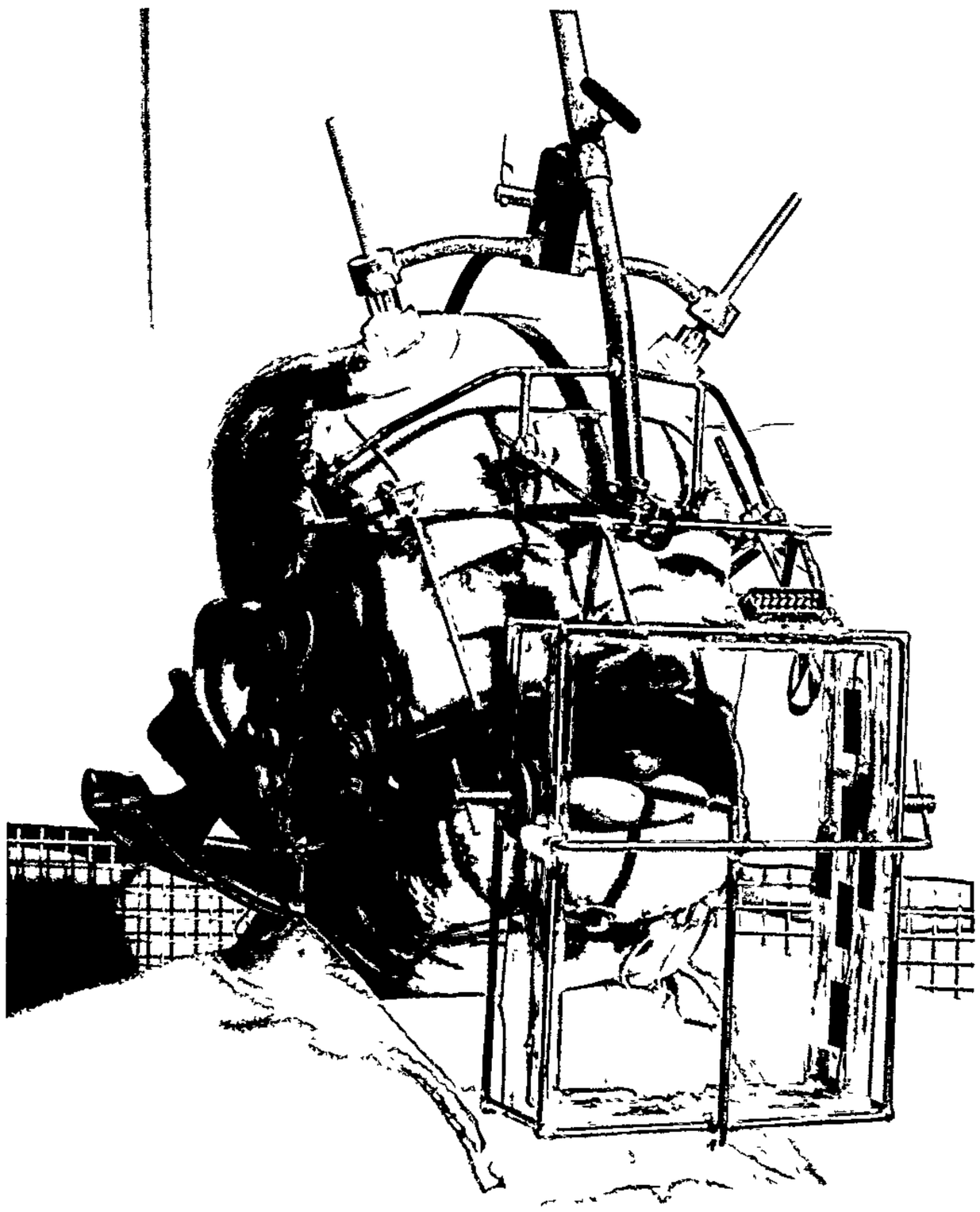


Fig.No.18.

FIGURE 19

The mandibulograph in position. The entire weight of the appliance is supported by the head. The mandible only carries the mandibular light, weighing 6.0 gms. The three point suspension of the photocell frame prevents independent movement of the frame during average activity. The subject can be fed from the front and also from the side.

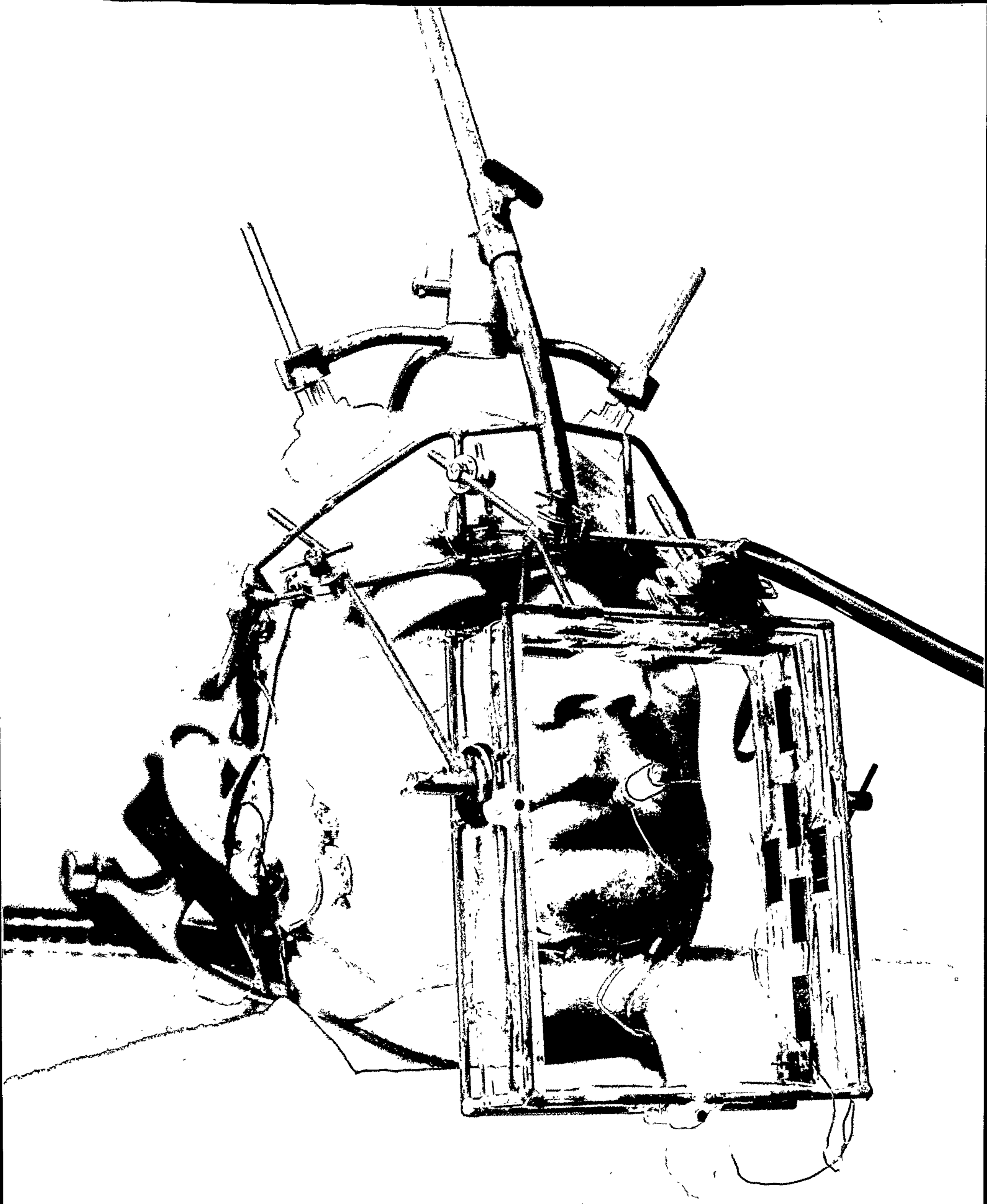


Fig. No. 19 .

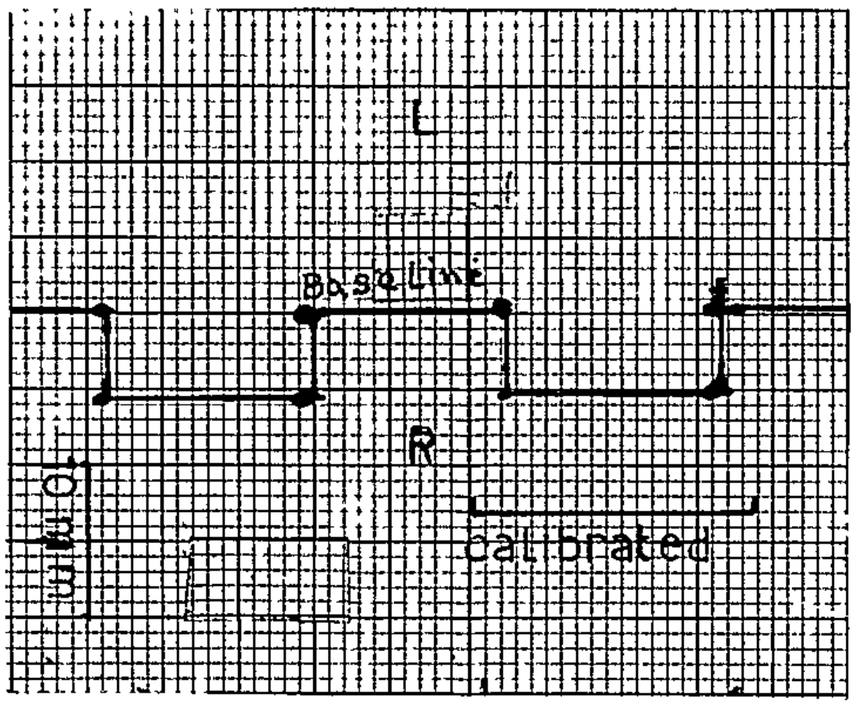
FIGURE 20

Calibration of the apparatus in individual subjects.

A. The subject performed a right lateral sliding contact excursion and engaged the point of the central bearing screw in the pit on the tracing table 5 mm. from the apex of the gothic arch tracing. The calibrated section of the tracing indicates a 5 mm. movement to the right.

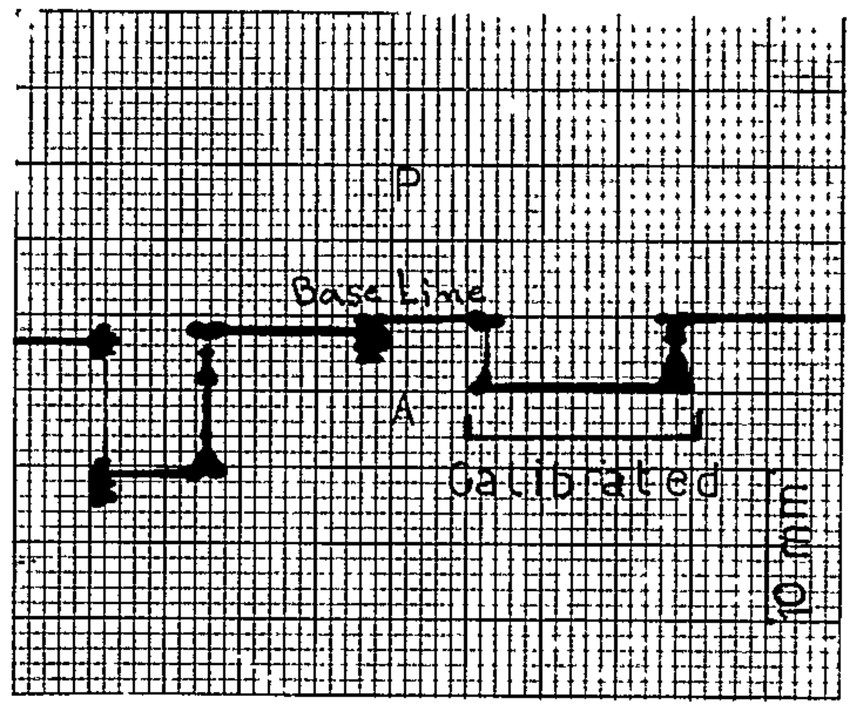
B. The subject performed a sliding contact protrusive excursion and held the lower jaw in the pit, 5 mm. in front of the apex of the gothic arch tracing. The calibrated section indicates a 5 mm. protrusion.

C. One centimeter prop was placed between the lower and upper incisors. The calibrated tracing shows a 1.0 cm. up-down movement.



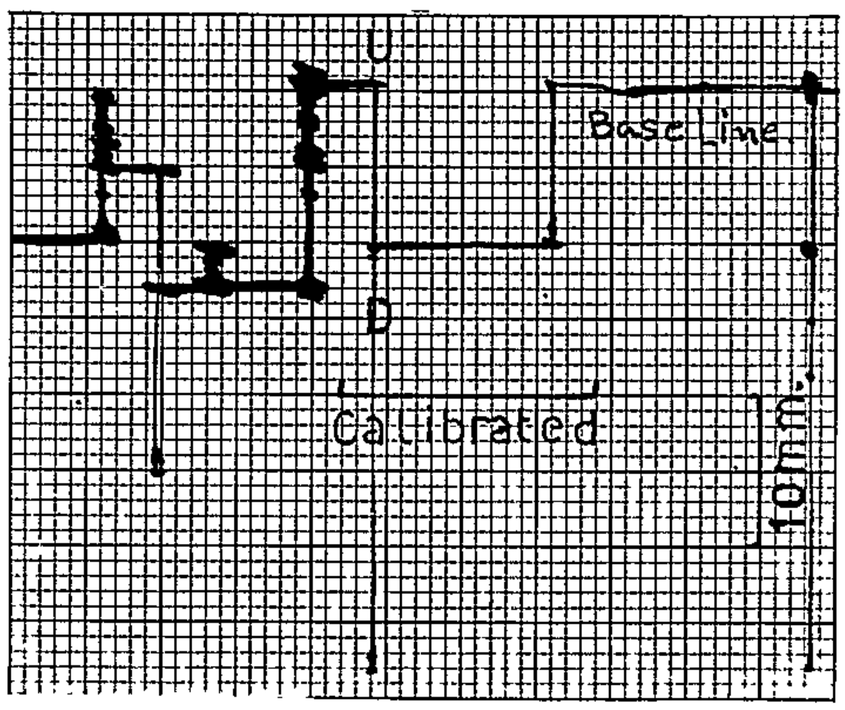
A

Right - Left



B

Anterior - Posterior



C

Up - Down

Fig.No.20.

FIGURE 21

Mandibulograph records of "open wide and close" excursion a, b, and c indicate three channels representing X axis or vertical component, Y axis or horizontal component, and Z axis or anterior-posterior components respectively.
d indicates the time channel.
From the up-down tracing on channel No. 1 points were selected 0.5 mm. to 5.0 mm. apart. Considering the base line as zero distances of these points from the base line were read and recorded as X axis co-ordinates. The Y and Z axis co-ordinates of these points were read from channels No. 2 and 3 respectively and recorded as under:

X Axis U/D	10.2 = 0	0.6	1.8	2.8	5.8	9.8	14.8	19.8	24.8
Y Axis R/L	24.3 = 0	0.3R	0.3R	0.3R	0.4R	1.6R	2.6R	3.2R	4.0R
Z Axis A/P	25.0 = 0	0.0	0.0	0.0	0.1P	0.0	0.5P	1.8P	3.5P

X Axis U/C	29.8	29.8	24.8	19.8	14.8	9.8	4.8
Y Axis R/L	5.0R	4.8R	4.2R	2.3R	1.8R	1.2R	1.3R
Z Axis A/P	4.5P	2.0P	0.5P	0.5A	0.3A	1.0A	0.5A

X Axis U/D	1.8	0.8	0.5	0.0
Y Axis R/L	0.5R	0.3R	0.3R	0.0
Z Axis A/P	0.0	0.0	0.0	0.2A

By plotting the X and Y co-ordinates or X and Z co-ordinates or Y and Z co-ordinates, the Frontal, Sagittal or Horizontal views of the movement could be developed. The plots were connected using the french curves.

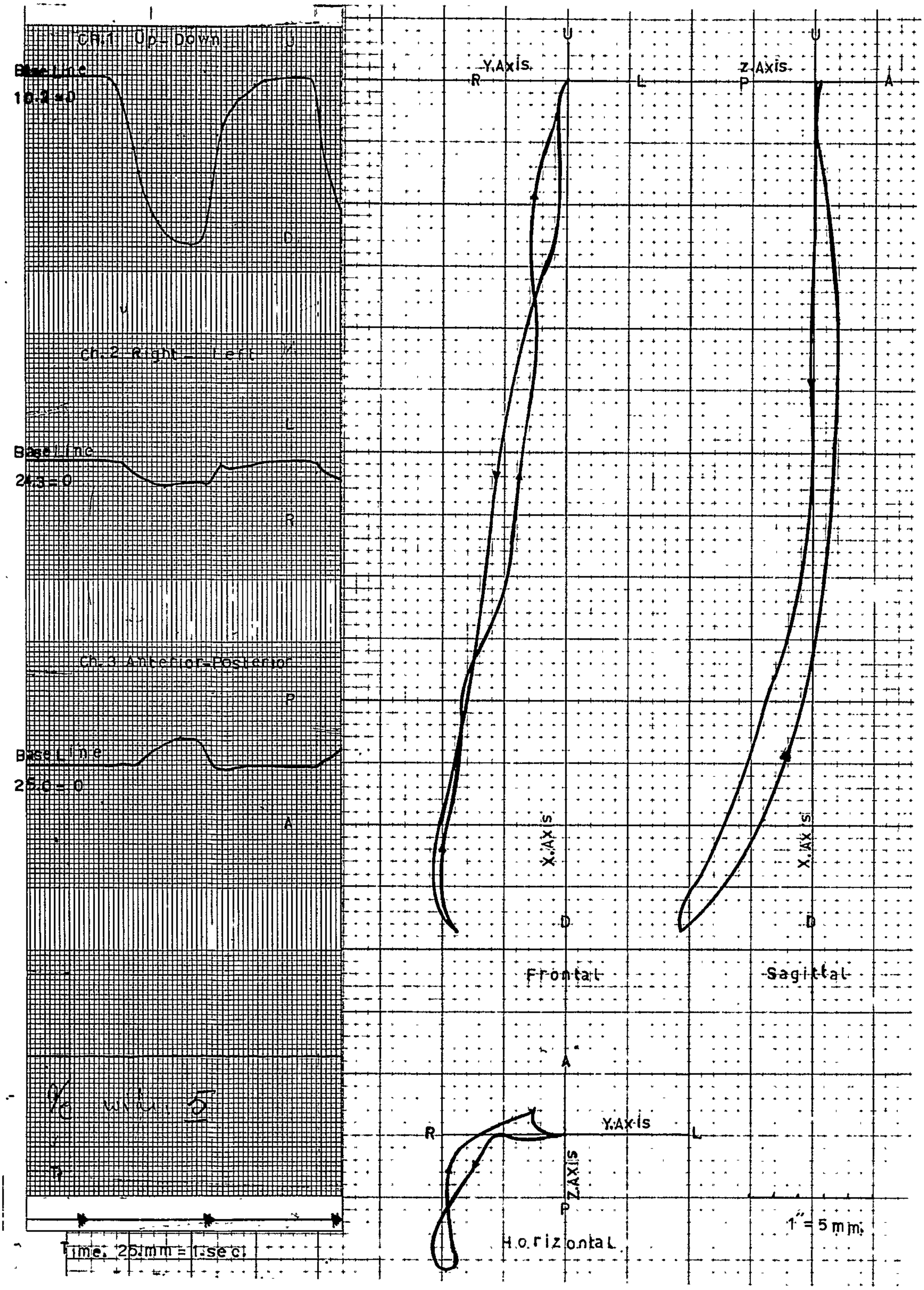

Ch.1 Up - Down
U
Base Line
18.2 = 0
D
U
Ch.2 Right - Left
R
Base Line
24.3 = 0
L
Ch.3 Anterior-Posterior
P
Base Line
25.6 = 0
A
Time. 25 mm = 1 sec
Y.Axis
R
L
U
D
X.AXIS
Frontal
Z-Axis
P
A
U
D
X.AXIS
Sagittal
A
Y.Axis
R
L
Z.AXIS
P
Horizontal
1" = 5 mm.

Fig.No.21.

FIGURE 22

Graphic illustration of X, Y and Z axes and a masticatory cycle in relation to a subject's face.

The X axis is at right angles to the horizontal or Camper's Plane and aligns with the median plane in the Frontal view running vertically. The Z axis runs parallel to the horizontal of the face and is located on the median plane running anteroposteriorly.

The Y axis runs from right to left parallel to the horizontal of the face and at right angles to the X and Z axes.

The Intercuspal Position I.C.P. is located at the intersection of the three axes and is also referred to as the Zero point. The X axis in relation to the Envelope of Total Movement Space and the masticatory cycles has also been referred to as the Central Vertical Axis, or the C.V.A.

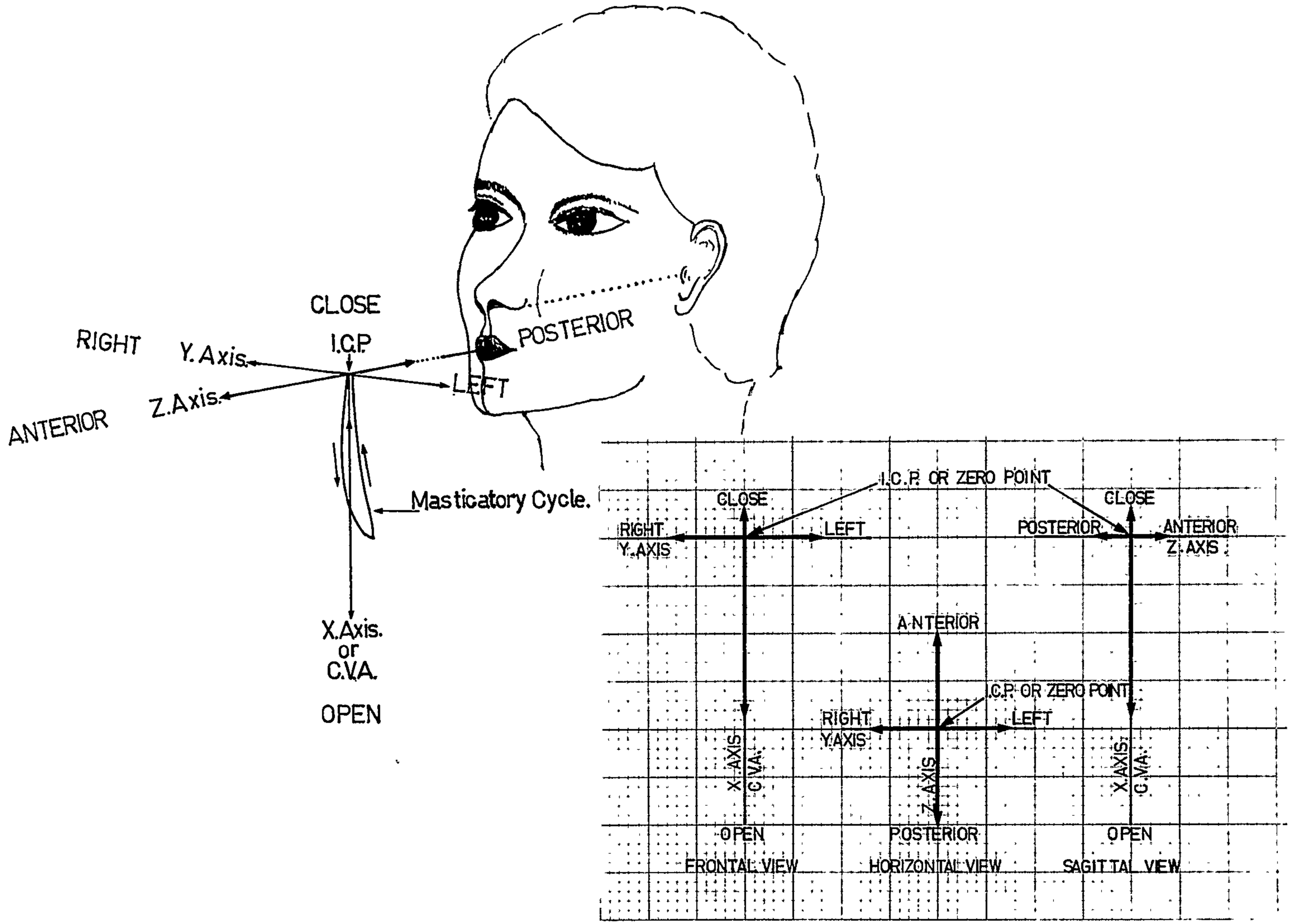

CLOSE
I.C.P.
RIGHT
Y. Axis.
POSTERIOR
LEFT
ANTERIOR
Z.Axis.
Masticatory Cycle.
X.Axis.
or
C.V.A.
OPEN
I.C.P. OR ZERO POINT
CLOSE
RIGHT
Y.AXIS
LEFT
POSTERIOR
ANTERIOR
Z.AXIS
ANTERIOR
C.P. OR ZERO POINT
RIGHT
Y.AXIS
LEFT
X.AXIS
C.V.A.
Z.AXIS
X.AXIS
C.V.A.
OPEN
POSTERIOR
OPEN
FRONTAL VIEW
HORIZONTAL VIEW
SAGITTAL VIEW

Fig.No.22 .

FIGURE 23

The repeat performances of same exercise even in the dentulous subject differed from one another and were not always marginal in the entire course. The figure shows Frontal and Sagittal views of four sliding contact protrusive excursions.

The maximally protruded position in all excursions was a constant point.

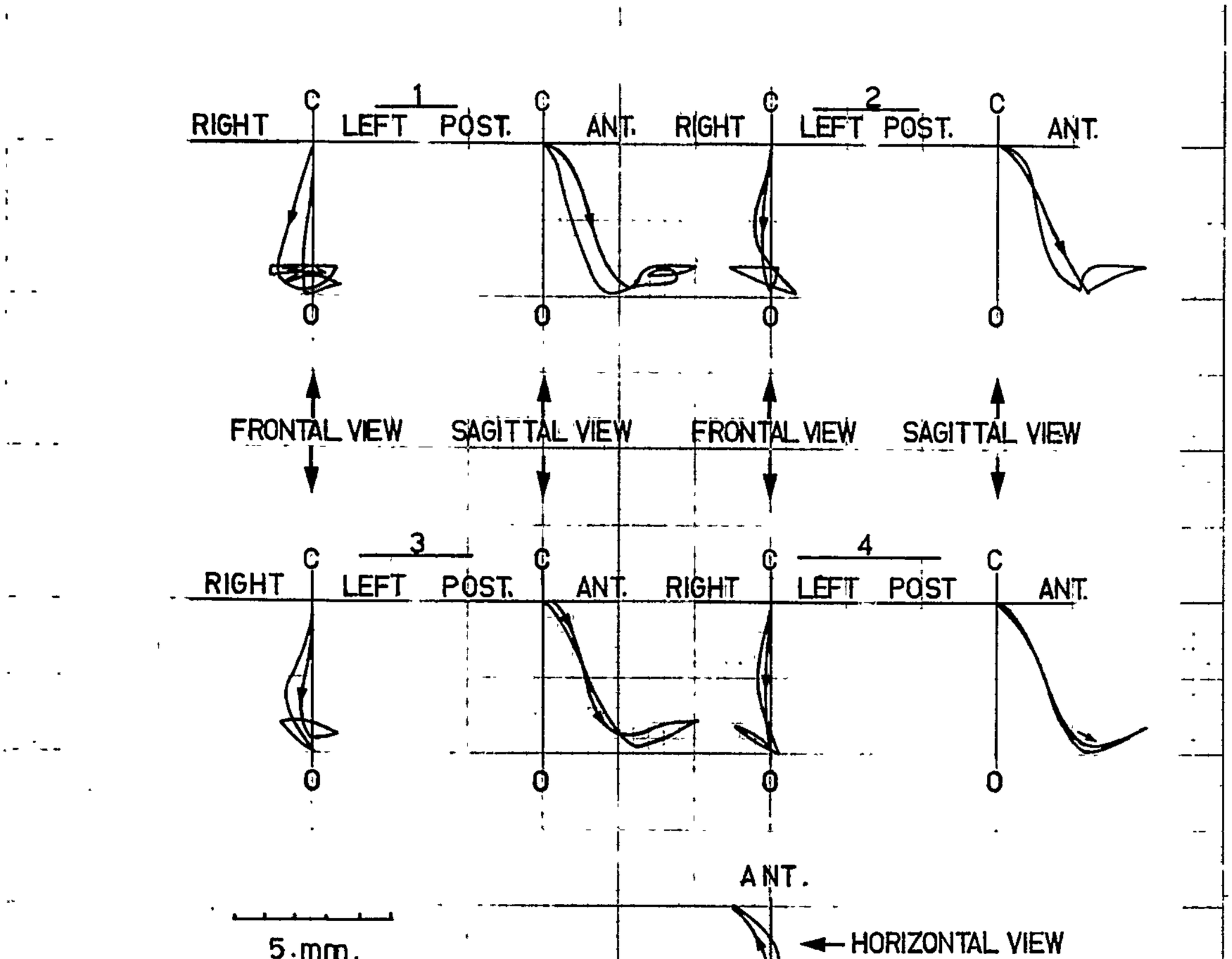

1
2
RIGHT
LEFT
POST.
ANT.
C
O
FRONTAL VIEW
SAGITTAL VIEW
3
4
5.mm.
HORIZONTAL VIEW

Fig. No. 23.

FIGURE 24

Shows the three views of the five border excursions and the particular sections (in thicker lines) used to construct the outline forms of the Envelope of Total Movement Space in dentulous subject.

a. Sliding Contact Protrusive (S.C.P.) excursion.

b. Sliding Contact Right (S.C.R.) excursion.

c. Sliding Contact Left (S.C.L.) excursion.

d. Open/Close During Posterior Traction (O/C post. tract.)

e. Sliding Contact Protrusive, Open/Close and Return. (S.C.P., O/C, Return).

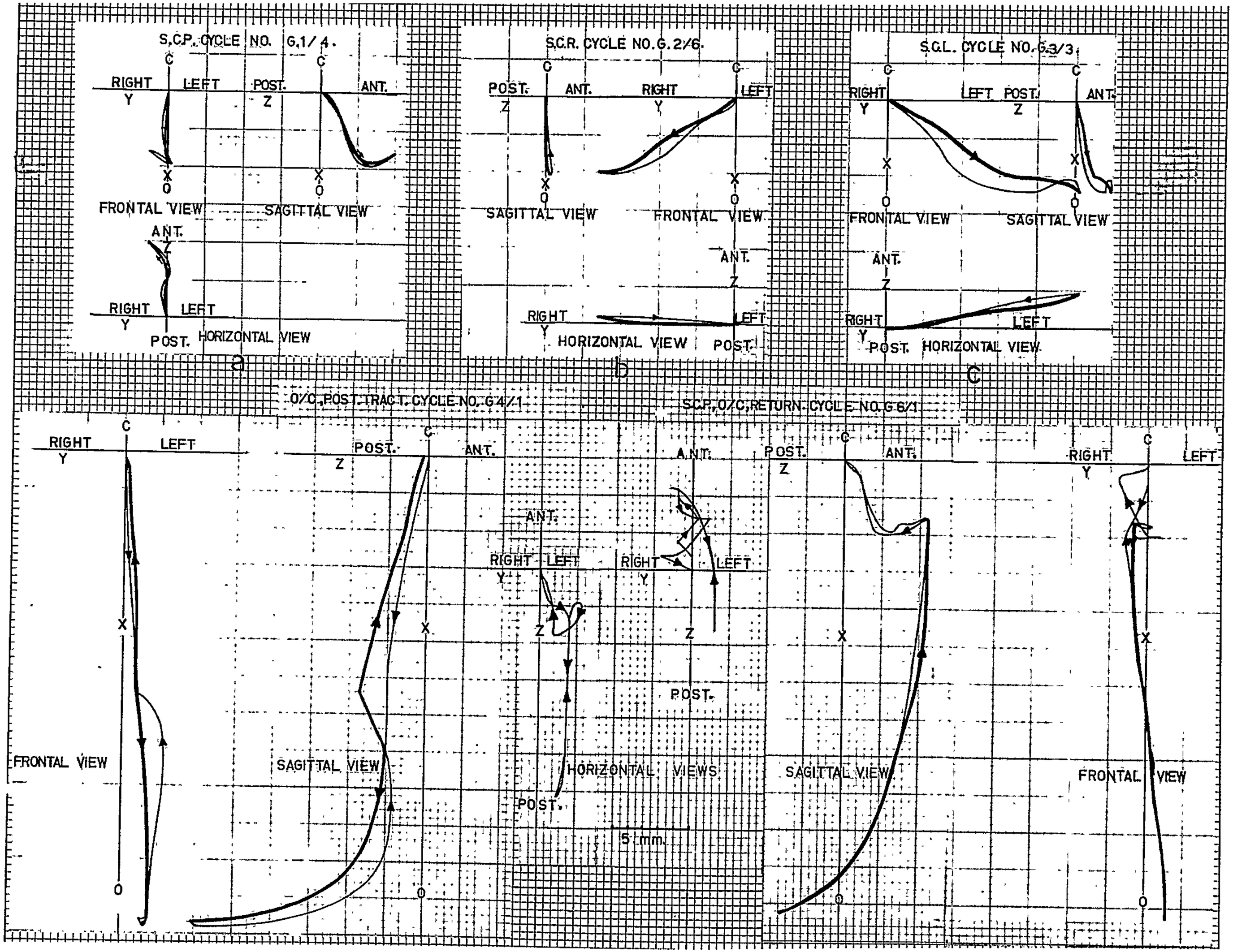

S.C.P. CYCLE NO. G.1/4.
RIGHT
LEFT
POST.
ANT.
Y
Z
C
X
O
FRONTAL VIEW
SAGITTAL VIEW
ANT.
RIGHT
LEFT
POST.
HORIZONTAL VIEW
a
S.C.R. CYCLE NO.G.2/6.
SAGITTAL VIEW
FRONTAL VIEW
HORIZONTAL VIEW
b
S.C.L. CYCLE NO.G.3/3.
FRONTAL VIEW
SAGITTAL VIEW
HORIZONTAL VIEW
c
O/C.POST.TRACT.CYCLE NO.G4/1
FRONTAL VIEW
SAGITTAL VIEW
HORIZONTAL VIEWS
5 mm.
d
S.C.P.O/C.RETURN.CYCLE NO.G 6/1
SAGITTAL VIEW
FRONTAL VIEW
e

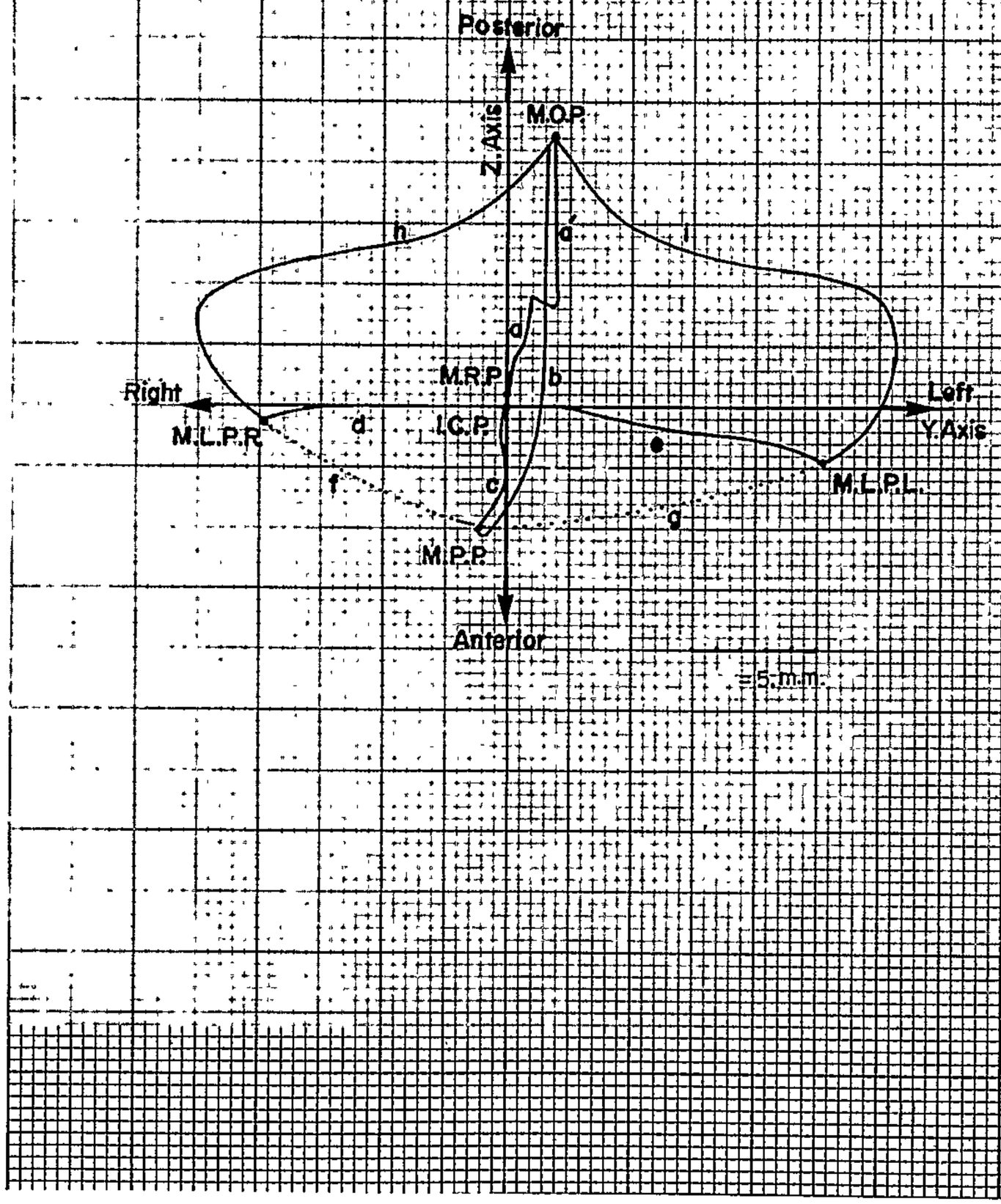
Fig. No. 24.

FIGURE 25

Horizontal view of the Total Envelope of Motion in dentulous subject. The occlusal boundary is rhomboidal in shape.

The posterior superior lateral paths 'd' and 'e' terminate at the intercuspal position. I.C.P. The right lateral path 'd' passed closer to the Y axis than the left path 'e'. The right lateral acute angle was wider than the left side. The whole envelope appeared to be rotated around a vertical axis towards the right or the preferred side. The maximally lateral position on the left side M.L.P.L. is located farther laterally than the maximally lateral position on the right side. M.L.P.R. The capacity for lateral motion is greater on the left side and capacity for distal motion is greater on the right, or preferred side.

HORIZONTAL VIEW OF THE TOTAL ENVELOPE OF MOTION. DENTULOUS SUBJECT 'A'



HORIZONTAL VIEW OF THE OCCLUSAL BOUNDARY OF THE TOTAL ENVELOPE OF MOTION IN DENTULOUS SUBJECT 'A'

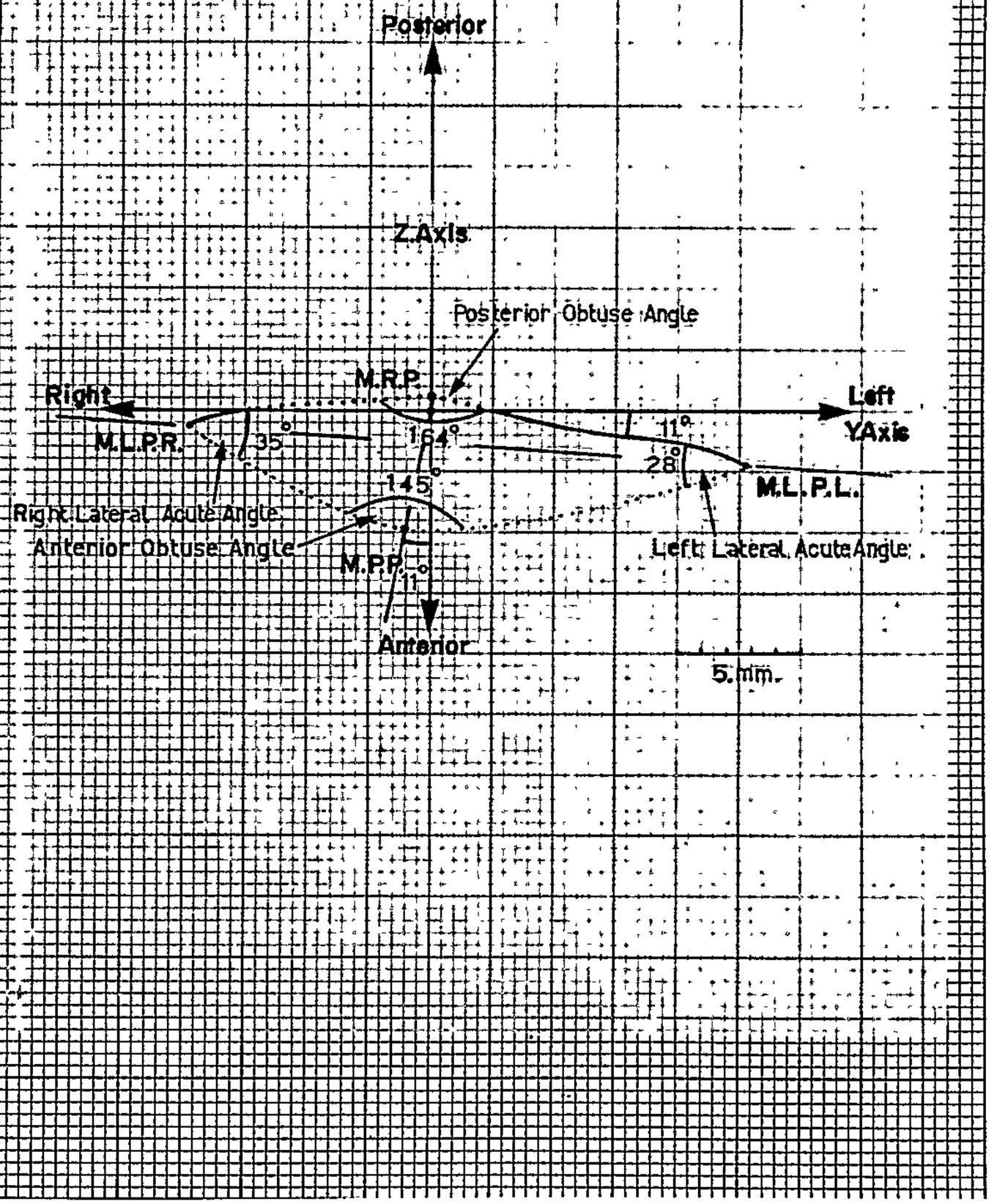


Fig. No. 25 .