APPENDIX 1. EDITORIAL NOTE ON THE FUNDAMENTAL FORMULÆ.

Let $\bar{X}_0, \bar{X}_1, \bar{X}_2 \ldots\ldots \bar{X}_p$ be the mean values, and $s_0, s_1, s_2 \ldots\ldots s_p$ the standard deviations of the variates $X_0, X_1, X_2 \ldots\ldots X_p$. We can then write the reduced variate as

$$x_p = (X_p - \bar{X}_p)/S_p \quad \ldots \quad \ldots \quad \ldots \quad (1.0)$$

The reduced moment coefficients may be written in the following way :—

$$q\left(x_1^{w_1} . x_2^{w_2}, \ldots x_p^{w_p}\right) \equiv \frac{1}{N} S \left(x_1^{w_1} . x_2^{w_2} \ldots\ldots x_p^{w_p}\right) \quad \ldots \quad (2.0)$$

It will be noticed that 'q' is simply an averaging operator, and in particular that

$$q(x_0) = q(x_1) = q(x_2) = \ldots\ldots q(x_p) = 0 \quad \ldots \quad (2{\cdot}1).$$

$$q(x_0^2) = q(x_1^2) = q(x_2^2) = \ldots\ldots q(x_p^2) = 1 \quad \ldots \quad (2.2)$$

$$q(x_0 x_1) = r_{01}, \quad q(x_1 x_2) = r_{1.2}, \quad \ldots \quad q(x_p x_q) = r_{pq} \quad \ldots \quad (2.3)$$

Also for any particular variate say X_p, $q(x_p^3) = \sqrt{\beta_1}$, $q(x_p^4) = \beta_2$ etc.... in more familiar notation.

The general method of procedure is quite straightforward. Let us write the regression of x_0 on a series of linear and non-linear terms in $x_1, x_2, \ldots\ldots x_p$ in the following form : –

$$x_0 = a_0 + a_1(x_1) + a_2(x_2) + \ldots\ldots a_p(x_p) + b_1(x_1^2) + \ldots\ldots b_p(x_p^2) + c_{pq} . (x_p x_q) + \ldots \quad (3.0)$$

Multiplying equation (3) successively by 1, $x_1, x_2, x_3 \ldots\ldots x_p$; $x_1^2, x_2^2, \ldots\ldots x_p^2$; $x_1x_2, x_1x_3 \ldots\ldots x_1x_p \ldots\ldots x_px_q$ etc. and averaging (that is summing up and dividing by the total number of observations) we get

$$0 = a_0 + 0.a_1 + 0\,a_2 + \ldots\ldots + 0.a_p + 1.b_1 + 1.b_2 + \ldots\ldots + 1.b_p + c_{12}.\,q(x_1x_2) + \ldots\ldots + c_{pq}(x_px_q) + \ldots\ldots\ldots \text{ etc.} \ldots \quad \ldots \quad \ldots \quad (4.1)$$

$$q(x_0x_1) = 0.a_0 + 1.a_1 + a_2.\,q(x_1x)\ldots\ldots a_p\,q(x_1x_p) + b_1\,q(x_1^3) + \ldots \quad b_p.q(x_1x^2) + c_{12}.\,q(x_1^2.x_2) + \ldots\ldots\ldots \text{etc.} \ldots \quad \ldots \quad \ldots \quad (4.2)$$

and a series of other equations of the same type.

It is clear from the mode of formation that the regression coefficients can be solved from the following set of linear equations :

	a_0	$a_1 . \ldots a_p$	$b_1 \ldots\ldots b_p$	$c_{12} \ldots\ldots$ c_{pq}
0	$1,$	$0, \ldots\ldots 0,$	$1, \ldots\ldots 1,$	$q(x_1x^2) \ldots\ldots q(x_px_q) \ldots$
$q(x_0x_1)$	$0,$	$1 \ldots\ldots q(x_1x_p),$	$q(x_1^3) \;..\; q(x_p^2),$	$q(x_1^2x_2) \ldots\; q(x_1x_px_q) \ldots$
$q(x_0x_p)$	$0,$	$q(x_1x_p), \ldots q(x_p^2),$	$q(x_1^2x_p) \ldots\; q(x_p^3),$	$q(x_1x_2x_p) \ldots\; q(x_p^2x_q) \;\ldots$
$q(x_0x_1^2)$	$1,$	$q(x_1^3) \;\ldots q(x_1^2x_p),$	$q(x_1^3) \;\ldots\; q(x_1^2x_p^2),$	$q(x_1^3x_2) \ldots\ldots q(x_1^2x_px_q) \ldots$
$q(x_0x_p^2)$	$1,$	$q(x_1x_p^2) \ldots q(x_p^3),$	$q(x_1^2x_p^2) \ldots q(x_p^4),$	$q(x_1x_2x_p^2) \ldots q(x_p^3x_q) \ldots$
$q(x_0x_1x_2)$	$q(x_1x_2),$	$q(x_1^2x_2) \ldots q(x_1x_2x_q),$	$q(x_1^3x_2) .. q(x_1x_2x_p^2),$	$q(x_1^2x_2^2) \ldots\; q(x_1x_2x_px_q)$

APPENDIX 2. NOTES ON COMPUTATION.

The raw moments were calculated from an origin $W_0 = 20$ gms., $C_0 = 10$ cm., $L_0 = 10$ cm., and $H_0 = 150$ cm. All the moments can be got directly from the tables of correlation except the third order moments like p(W C L), p(WCH), p(WLH). These were obtained by writing down all the 2000 combination values on cards, sorting out the cards for constant W, forming separate tables for each value of W and summing up for all values $\Sigma[W\Sigma(CL)]$, all measures being taken from the raw origins chosen.

Reduction of Moments to the Mean. These were obtained from the well known formulæ of Pearson, Elderton and Isserlis, where the symbols $p'(W^a C^b L^d)$ etc. refer to raw moments, and $p(W^a C^b L^d)$ etc. denote moments transformed to origin as mean, and c', l', h', the deviations of the raw moments origins from their respective true means. The formulæ (for moments other than the first four moments) are as follows:—

$$p(c^2.l) = p'(c^2 l) - 2c'.p'(c.l) - l'.p'(c^2) - 2l'c'^2$$
$$p(c^3 l) = p'(c^3.l) - 3c'.p'(c^2.l) + 3c'^2 p'(c.l) - l'.p'(c^3) + 3l'c'.p'(c^2) - 3c'^3 l$$
$$p(c^2.l^2) = p'(c^2.l^2) - 2l'.p'(c^2.l) - 2c'.p'(c.l^2) + l'^2 p'(c^2) + c'^2 p'(l^2) + 4c'l'p'(c.l) - 3l'^2 c'^2$$
$$p(w.c.l) = p'(w.c.l) - w'.c'.l' - w'p(c.l) - c'.p(l.w) - w'.p(c.w)$$

In order to avoid complications introduced in the analysis of variance, Sheppard's correction for grouping was not applied.

Reduced Moments. These were got from the above values thus:—

$$q(w^a.c^b.l^d.) = p(w^a.c^b.l^d)/s_w^a . s_c^b . s_l^d, \quad \text{making} \quad q(c^2) = q(l^2) = q(w^2) = 1$$

These reduced moments (i. e. in terms of standard deviations) were as follows:—

q (w.c)	=	0·924763	q (c².h)	=	0·250288
q (w.l)	=	0·726965	q (l².h)	=	0·226542
q (w.h)	=	0 498747	q (c³.l)	=	2·124325
q (c.l)	=	0·602026	q (c³.h)	=	1·607458
q (c.h)	=	0·509636	q (c.l³)	=	1·963609
q (l.h)	=	0·380331	q (c.h³)	=	1·576746
q (w.c²)	=	0·816361	q (c².l²)	=	1·913976
q (w.l²)	=	0·553720	q (c².h²)	=	1·659308
q (w.h²)	=	0·311329	q (l².h²)	=	1·284831
q (c.l²)	=	0·359529	q (w.c.l.)	=	0·522649
q (c.h²)	=	0·252211	q (w.c.h)	=	0·308384
q (c².l)	=	0·413723	q (w.l.h)	=	0·193452

q (w³)	=	1·213355	=	$\sqrt{{}_w(\beta_1)}$	q (w⁴)	=	4·887514	=	${}_w\beta_2$
q (c³)	=	0·680452	=	$\sqrt{({}_c\beta_1)}$	q (c⁴)	=	3·545555	=	${}_c\beta_2$
q (l³)	=	0·712301	=	$\sqrt{({}_l\beta_1)}$	q (l⁴)	=	3·048313	=	${}_l\beta_2$
q (h³)	=	0·133472	=	$\sqrt{({}_h\beta_1)}$	q h⁴)	=	3·080872	=	${}_h\beta_2$

Let us apply these values to the solution of a simple case, say the regression of W on C. Pearsons's equation takes the form:—

$$\frac{W-\overline{W}'}{s_w} = r_{cw} . \frac{C-\overline{C}'}{s_c} + \frac{\bar{\varepsilon}}{\phi_2} . \left\{ \frac{(C-\overline{C}')^2}{s_c^2} - \sqrt{\beta_1} . \frac{(C-\overline{C}')}{s_c} - 1 \right\}$$

The computed values are :—

$\bar{\epsilon} = q(c^2.w) - r\sqrt{\beta_1} = 0{\cdot}196352$, $q(c^2.w) = 0{\cdot}816361$

$\phi_2 = \beta_2 - \beta_1 - 1 = 2{\cdot}096066$, $r_{cw} = 0{\cdot}924763$

$\dfrac{\bar{\epsilon}}{\phi_2} = \dfrac{0{\cdot}196352}{2{\cdot}096066} = 0{\cdot}093676$, $\sqrt{\beta_1} = 0{\cdot}670452$

The equation thus becomes :—

$$\frac{W-\bar{W}'}{s_w} = 0{\cdot}924763 \cdot \frac{(C-\bar{C}')}{s_c} + 0{\cdot}093676 \left\{\frac{(C-\bar{C}')^2}{s_c^2} - 0{\cdot}670452 \frac{(C-\bar{C}')}{s_c} - 1\right\}$$

$$= 0{\cdot}861958 \cdot \frac{C-\bar{C}'}{s_c} + 0{\cdot}003676 \frac{(C-\bar{C}')^2}{s_c^2} - 0{\cdot}093676$$

If we substitute the values of s_w, s_c w c, in grammes and centimeters respectively, the equation reduces to

$$W = 0{\cdot}31696\ (C^2) - 2{\cdot}07187\ (C) + 6{\cdot}2407$$

Analysis of Variance. The total sum of squares accounted for by linear regression is given below in grouping units of 3 gms.

$$\frac{[S(W-\bar{W}')(C-\bar{C}')]^2}{S(C-\bar{C})^2} = r^2 \times N.S_w^2 = 0{\cdot}855157 \times 19541{\cdot}6 = 16711{\cdot}7$$

The proportion of total sum of squares accounted for parabolic regression is equal to

$$0{\cdot}861958 \times r_{cw} + 0{\cdot}093676 \times q(c^2w) = 0{\cdot}797107 + 0{\cdot}076470 = 0{\cdot}873580 \quad \ldots \quad (7)$$

The extra contribution of the parabolic term is therefore

$$(0{\cdot}873580 - 0{\cdot}855187) \times N\ S_w^2 = 0{\cdot}018393 \times 19541{\cdot}6 = 359{\cdot}6. \quad \ldots \quad (8)$$

This can be derived directly from the orthogonal form of Pearson's equation. The additional contribution of the parabolic factor is simply the square of the second term and reduces (in agreement with the previous result) to

$$\left\{\frac{\bar{\epsilon}}{\phi^2}\right\}^2 \left\{\beta_2 - \beta - 1\right\} = \frac{\bar{\epsilon}^2}{\phi^2} = 0{\cdot}01839 \quad \ldots \quad (9)$$

Numerical Check. The analysis of variance can be checked from raw totals of sums of squares and moment products. The reduction to mean and conversion of the moments in terms of standard deviations involves by far the greater part of the labour in computation. It is therefore useful to check the result by alternative methods. This can be done from the totals of raw moments themselves as follows:

In the present case, if $W = a + bC + d.C^2$. ... ... (10)
we get three sets of equations.

$$\left.\begin{aligned} \Sigma W &= na + b\Sigma C + d\Sigma C^2 \\ \Sigma WC &= a\Sigma C + b\Sigma C^2 + d\Sigma C^3 \\ \Sigma WC^2 &= a\Sigma C^2 + b\Sigma C^3 + d\Sigma C^4 \end{aligned}\right\} \quad \ldots \quad \ldots \quad \ldots \quad (11)$$

Or

$$\begin{aligned} 1552 &= 2600a + 3711b + 29057d \\ 22129 &= 3711a + 29057b + 185685d \\ 150559 &= 29057a + 185685b + 1720469d \end{aligned}$$

We get, $a = -0\cdot927420$, $b = 0\cdot711241$, $d = 0\cdot026411$, ... (11 a)

From this, the sums of squares accounted for by parabolic regression can be found as follows (for proof see later).

$$N\,S_w^2 \times {}_wH_{0.0}^2 = b\{\Sigma cw - W'\Sigma c\} + d\{\Sigma c^2w - W'\Sigma c^2\}. \quad \ldots \quad (12)$$

where W′ is distance of the chosen origin from the mean. Substituting the above value we get

$$N\,S_w^2 \times {}_wH_{0.0}^2 = 19715\cdot46 - 2643\cdot71 = 17071\cdot7$$

Of this, the linear regression contribution $= 16711\cdot7$

Therefore, the parabolic contribution $= 360\cdot0$ ... (13)

agreeing reasonably with the previons result 359.6.*

Proof. In general, the analysis of variance from raw moment totals can be done as follows. If

$$w = a + bx + cy + dxy + ex^2 + fy^2 \text{ etc.} \quad \ldots \quad \ldots \quad (14)$$

all measurements of W, X, Y.........being taken from the chosen origins, we have

$$(w - w') = (a - w') + bx + cy + dxy + ex^2 + fy^2. \quad \ldots \quad \ldots \quad (14.1)$$

where w' is the distance of this origin from the mean, and therefore $(w-w')$ distance of the actual values from the mean.

Therefore

$$(w-w')^2 = (a-w')(w-w') + bx(w-w') + cy(w-w') + dxy(w-w') + ex^2(w-w') + fy^2(w-w') \text{ etc.} \quad \ldots \quad \ldots \quad \ldots \quad \ldots(14.2)$$

Summing up for all values, we get the total sum of squares due to the regression equation from the true mean in terms of the raw moment totals. That is

$$\begin{aligned}\Sigma(w-w')^2 &= NS_w^2.{}_wH^2_{x.y.xy,x^2,y^2}\ldots\ldots\ldots \\ &= b\{\Sigma xw - w'\Sigma x\} + c\{\Sigma yw - w'\Sigma y\} = d\{\Sigma wxy - w'\Sigma xy\} \\ &= e\{\Sigma wx_2 - w'\Sigma x^2\} + f\{\Sigma wy^2 - w'\Sigma y^2\}\ldots\ldots\ldots \quad \ldots \quad (14.3)\end{aligned}$$

If we solve the sets of equations to find a, b........., we can also get the equation of W in terms of x and y. If X, Y and W represent the values of the raw origin chosen, the equation of W will then be

$$(w-W) = a + b(x-X) + c(y-Y) + d(x-X)(y-Y) + e(x-X)^2 + f(y-Y)^2. \quad (14.4)$$

It is thus possible to derive the equations and analysis of variance from the raw moment totals, without calculating the reduced moments (or q values), although the latter are preferable for theoretical study and comparative check on the second.

* All the sums of squares given in this note are in terms of class intervals 3gms. for W, and have to be multiplied by 9 to give the figures given in the tables of the text.

APPENDIX 3·1.

Circumference of Head in Cms. (C) × **Weight of Head in Grams (w)**

Mid-point	7–9	10–12	13–15	16–18	19–21	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	46–48	49–51	52–54	55–57	58–60	61–63	64–66	67–69	70–72	TOTAL
7·0	—	1																					1
7·5	7	6	—																				13
8·0	16	23	4	—																			43
8·5	4	48	13	2	—	—	—	—															67
9·0	1	73	73	17	5	4	1	1															175
9·5	—	23	95	56	8	8	1	—															191
10·0	—	9	78	144	57	13	2	—															303
10·5	1	—	9	59	85	27	6	2	—														189
11·0	—	—	5	39	104	90	37	7	3	—													285
11·5		1	1	7	25	55	44	19	2	2	—	—											156
12·0		—	—	—	5	46	76	52	16	7	3	1											206
12·5					1	2	12	32	21	11	8	2	—										89
13·0					—	3	7	15	24	25	18	2	1	—									95
13·5						—	—	3	8	19	11	12	3	1	—	—							57
14·0								—	3	8	8	6	16	2	2	1							46
14·5									—	3	6	12	7	3	5	—							36
15·0										—	2	6	9	2	4	3							26
15·5											—	—	—	2	—	—	—		—				3
16·0														1	3	2	1		3	—			11
16·5														—	1	1	2	—	—	1	—	—	4
17·0 & above.															—	—	1	1	1	—	—	2	4
TOTAL ...	29	184	278	234	290	248	186	131	77	75	56	41	36	11	15	7	4	1	4	1	—	2	2000

APPENDIX 3·2. WEIGHT OF HEAD IN GRAMS. (w).

LENGTH OF HEAD IN CMS. (L).

Mid-point	7–9	10–12	13–15	16–18	19–21	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	46–48	49–51	52–54	55–57	58–60	61–63	64–66	67–69	70–72	TOTAL.
7·0	8	18	1	—	2	1																	25
7·5	9	23	8	5	1	—																	46
8·0	14	71	65	29	7	3	1	1															191
8·1	1	42	86	61	84	9	5	—															238
9·0	1	17	52	111	90	55	16	6	2	1													351
9·5	1	8	23	38	58	61	40	25	11	3	2												270
10·0		4	22	22	26	42	45	25	11	13	6	1	—	—	1								221
10·5		1	8	12	7	12	17	18	16	12	8	3	3	1	—								118
11·0			11	29	28	16	11	8	11	12	11	10	3	—	1	—	1						152
11·5			—	16	22	24	17	4	5	8	4	9	8	4	—	—	—	—	1				122
12·0			2	1	12	19	15	17	11	6	6	5	1	—	3	—	—	—	—				98
12·5						5	18	19	4	6	5	4	3	1	2	2	—	1	—				70
18·0						1	1	6	5	9	6	4	4	1	3	—	—	—	—	—	—	2	42
13·5								2	1	3	7	4	6	2	—	2	1	—	—	—			28
14·0										1	—	—	5	—	1	1	1	—	2	1			12
14·5										—	—	2	3	2	3	2	1	—	1				14
15·0										—	—	—	—	—	1								1
15·5										1													1
TOTAL ...	29	184	278	324	290	248	186	131	77	75	55	42	36	11	15	7	4	1	4	1	—	2	2000

APPENDIX 3·3. CIRCUMFERENCE OF HEAD IN CMS. (c).

LENGTH OF HEAD IN CMS. (L).

Mid-point	6·5	7·0	7·5	8·0	8·5	9·0	9·5	10·0	10·5	11·0	11·5	12·0	12·5	13·0	13·5	14·0	14·5	15·0	15·5	16·0	16·5	17·0	17·5	18·0	TOTAL.
7·0			3	5	4	8	3	1	—	—	—	—	—	1											25
7·5			4	8	7	10	9	5	2	1	—	—	—	—											46
8·0			2	17	22	55	29	41	12	7	3	2	1	—											191
8·5		1	—	4	18	40	47	48	27	31	13	6	1	2											238
9·0			—	5	6	22	34	81	56	82	29	30	3	2	1										351
9·5			2	2	4	8	15	40	29	51	39	45	18	10	3	4									270
10·0			1	—	4	8	18	25	10	36	25	45	16	14	11	4	3	—	—	1					221
10·5			1	1	—	7	7	7	5	8	10	20	12	23	6	6	1	4	—	—					118
11·0				1	2	14	13	24	16	17	4	13	7	10	9	8	10	3	—	—	1				152
11·5						3	14	16	14	18	11	7	6	5	8	4	6	8	1	—	—	—	—	1	122
12·0							2	12	13	16	13	11	12	6	8	8	3	2	—	2	—	—	—	—	98
12·5								3	4	13	6	18	6	5	2	3	3	4	—	1	1	1	—	—	70
13·0									1	4	2	4	5	9	7	4	—	3	—	1	—	—	—	2	42
13·5										1	1	5	2	5	6	2	3	1	—	2	—				28
14·0														1	—	5	2	—	1	2	1				12
14·5														1	1	3	5	1	—	2	1				14
15·0														—	—	—	—	—	1						1
15·5														1											1
TOTAL..	—	1	13	43	67	175	191	303	189	285	156	206	89	95	57	46	36	26	3	11	4	1	—	3	2000

APPENDIX 3·4. HEIGHT OF PLANT IN CMS. (h)

LENGTH OF HEAD IN CMS. (C)

Mid-point	122—124	125—127	128—130	131—133	134—136	137—139	140—142	143—145	146—148	149—151	152—154	155—157	158—160	161—163	164—166	167—169	170—172	173—175	176—178	179—181	182—184	185—187	188—190	191—193	194—196	197—199	200—202	TOTAL.
7·0					1	3	1	3	3	2	3	4	—	2	3													25
7·5	1	—	—	—	1	2	4	9	7	5	7	4	—	2	3	—	1											46
8·0	—	—	2	5	5	3	21	21	22	16	27	17	20	11	15	4	1	—	1									191
8·5	—	—	1	7	5	3	12	14	15	35	34	22	25	24	21	7	11	2	—									238
9·0	—	—	—	3	3	5	14	17	23	24	47	27	47	38	45	15	22	12	7	2								351
9·5	1	—	1	1	2	3	8	8	16	17	31	33	25	30	38	20	26	4	1	2		2	1					270
10·0		—	—	—	4	2	3	8	8	15	22	19	18	26	35	10	19	9	7	4	5	5	2					221
10·5		—	—	—	3	2	3	6	1	5	12	10	17	6	10	7	13	7	10	1	—	3	1	1				118
11·0		—	1	—	—	5	6	8	7	6	18	11	16	17	16	9	11	4	4	4	6	1	—	2				152
11·5		—	—	2	1	—	2	4	4	5	20	7	16	15	13	9	7	5	2	3	3	2	—	1	—	1		122
12·0		—	—	—	—	—	3	5	2	7	9	6	7	11	13	6	12	6	2	2	3	2	2	—				98
12·5		1	—	—	—	—	—	—	5	3	4	3	6	8	8	6	8	6	3	2	2	4	—	1				70
13·0			1	—	—	—	—	—	—	3	—	3	4	3	2	5	8	6	3	—	3	—	1	—				42
13·5			1	—	—	—	—	1	—	2	—	2	1	1	4	1	1	4	5	2	1	1	—	1				28
14·0											1	—	1	—	—	—	2	2	1	—	1	3	—	1				12
14·5											1	1	—	1	1	—	2	3	1	1	—	—	1	—	2			14
15·0																						—	1					1
15·5																						1						1
TOTAL	2	1	7	18	25	28	77	104	113	145	236	169	203	195	227	99	144	70	47	23	24	24	9	7	2	1	—	2000

Appendix 3·5. Height of Plant in Cms.

Circumference of Head in Cms. (C).

Mid point	122—124	125—127	128—133	131—133	134—136	137—139	140—142	143—145	146—148	149—151	152—154	155—157	158—160	161—163	164—166	167—169	170—172	173—175	176—178	179—181	182—184	185—187	188—190	191—193	194—196	197—199	200—202	Total.
7·0									1																			1
7·5				2	1	1	1	3	1		3				1													13
8·0				—	1	4	4	11	7	3	6	3	2	1	1													43
8·5	1		1	2	3	2	7	7	10	8	6	4	4	3	5	1	2		1									67
9·0	—		1	4	4	3	19	16	16	26	27	15	15	14	14	—	—		—					1				175
9·5	—		1	5	5	6	10	13	22	21	33	20	20	15	10	4	2	2	2					—				191
10·0	1		1	4	3	7	17	23	18	29	41	31	42	28	29	9	12	6	1				1	—				303
10·5			—	—	2	—	5	6	16	17	26	19	20	20	29	8	10	5	2	2	1		—	—	1			189
11·0			—	—	2	—	6	11	6	19	28	25	34	40	34	26	34	9	9	1	—	1	—	—	—			285
11·5			—	1	1	3	3	7	6	3	17	20	18	18	18	7	21	6	4	1	1	1	—	—	—			156
12·0			—		—	—	3	3	4	7	21	15	23	22	38	19	21	12	7	3	2	5	—	1	—			206
12·5			1		1	2	—	1	1	2	12	4	7	14	14	8	6	8	1	4	2	—	1	—	—			89
13·0			1		—		—	1	2	6	4	7	7	8	15	8	15	8	4	1	2	6	—	—	—			95
13·5			1		1		1	—	—	1	3	3	4	6	8	3	8	4	5	2	2	3	1	1	—			57
14·0					—		1	1	1	3	3	2	3	3	6	2	7	3	1	1	3	3	2	—	—	1		46
14·5					—			1	1		2	—	2	1	3	2	1	4	6	2	7	2	1	1	—			36
15·0					—				—		3	—	2	2	2	1	2	2	2	5	—	2	2	1	—			26
15·5					1				—		—	—				—	2	—	—	—	—	—	—	—	—			3
16·0									1		—	1				1	—	1	1	1	2	—	1	1	1			11
16·5		1									—						1		—		—	1		1				4
17·0 & above											1								1		2							4
Total	2	1	7	18	25	28	77	104	113	145	236	169	208	195	227	99	144	70	47	28	24	24	9	7	2	1	—	2000

APPENDIX 3·6. HEIGHT OF PLANT IN CMS.

WEIGHT OF HEAD IN GMS. (H)

Mid-point	122—124	125—127	128—130	131—133	134—136	137—139	140—142	143—145	146—148	149—151	152—154	155—157	158—160	161—163	164—165	167—169	170—172	173—175	176—178	179—181	182—184	185—187	188—190	191—193	194—196	197—199	200—202	Total
7·9	—		1	2	2	4	4	6	6	1	2	—	1															29
10·12	1		1	5	4	5	20	20	21	27	30	22	9	6	10	1	1	—	1									184
13·15	—		1	6	7	4	18	25	31	36	42	30	28	24	19	2	5	—	—									278
16·18	—		1	2	5	8	17	24	21	27	41	30	44	32	35	10	14	5	4	2			1	1				324
19·21	1		—	1	3	3	9	13	14	19	31	28	38	33	39	17	23	10	4	2		2	—	—				290
22·24			—	2	1	2	2	5	8	10	33	20	29	28	39	20	32	11	5	—	1	—	—	—				248
25·27			1		—	—	3	6	1	12	22	13	15	33	26	15	17	11	8	1	—	2	—	—				186
28·30			1		1	1	2	1	6	1	12	7	16	14	18	11	18	8	6	3	2	3	—	—				131
31·33			—		—	1	—	—	1	2	8	4	7	8	14	6	7	7	2	3	4	2	1	—				77
34·36			—		—		1	—	1	3	3	6	5	6	9	9	14	4	3	2	3	5	1	—				75
37·39			—		1		—	2	—	5	1	7	5	4	10	2	3	3	3	1	3	1	1	3				55
40·42			1		—		—	2	2	—	6	—	2	4	4	3	1	1	4	1	4	5	1	—	1			42
43·45					—		—		—	2	2	1	2	1	2	2	4	7	3	3	1	2	2	1	—	1		36
46·48					1		—		1		1	—	1	2	1	—	2	1	1	—	—	—	—	—	—			11
49·51		1					1				1	1	1		—	1	—	1	1	3	3	—	1	-	—			15
52·54											—				1		2	1	—	2	—	1	—	—	-			7
55·57											—						1		—		2	—	—	1	—			4
58·60											—								—		—	—	—	1	—			1
61·63											1								1		—	—	1		1			4
64·66																			—		—	1						1
67·69																			—		—							—
70·72																			1		1							2
Total	2	1	7	18	25	28	77	104	118	145	236	169	203	195	227	99	144	70	47	28	24	24	9	7	2	1	—	2000