

WEIGHT, HEIGHT AND NUTRITION.

OBSERVATIONS FROM THE ISLE OF ELY.

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THE Isle of Ely is the northern half of the geographical County of Cambridgeshire and forms in itself a separate administrative county. It is the heart of the fen country, and its population is one which long retained a degree of isolation and independence tending to preserve in its members certain mental, and perhaps physical characters peculiar to themselves. It is interesting to recall that from this neighbourhood came Boadicea, Queen of the Iceni, and Hereward the Wake, who proved such stubborn enemies to the conquerors of their country.

In 1933 an investigation was undertaken for the purpose of arriving at normal standards of height and weight of elementary school children for this area, and, by deduction, at the apparent amount of malnutrition existing within it.

METHOD OF COLLECTION OF THE DATA.

The data were collected for the most part during a special series of visits to the schools, though a few were obtained during the routine medical examinations. In all, over 5000 children were measured.

For the weighings a short lever machine of known accuracy was used. The type of machine adopted is, I believe, of importance. Spring machines of the "personal" weighing type are in use in many of the schools in this area. The objections to these are:

- (1) They are frequently not properly adjusted.
- (2) Where there is an error this is generally not a constant one but varies with the weight.
- (3) It is difficult to read the weight to the required degree of accuracy since the whole dial in the pattern in use here is less than 6 in. in diameter, and a length of $\frac{3}{4}$ in. only is allowed for each 14 lb. It seems obvious that the source of error must be very considerable, for it is certainly impossible to read a weight more accurately than to the nearest pound.
- (4) Personal observation shows that by varying slightly one's position on the machine a difference of about 2 lb. can be made in the weight recorded.
- (5) Since in this type of machine the figures on the dial are reversed, and are read from their reflection in a mirror, a further source of possible error is introduced.

The sources of error in taking heights are not so great, but the standards already existing in the schools were checked for the purpose of the present

study. Heights were taken to the nearest $\frac{1}{2}$ in. and weights to the nearest $\frac{1}{2}$ lb. The weights and heights were entered on individual cards together with the name, date of birth, and date of examination. The sexes were distinguished by the use of blue cards for boys and pink for girls. In compiling the tables it was found convenient to utilise merely whole numbers, thus, heights of 50 in. included those previously recorded as 50 and 50.5 in. From the method of recording it will be seen that the midpoint of the whole group would be 50.25 in. Similar reasoning applies to the recorded weights. In arriving at the final figures for the means, this grouping was allowed for. All measurements were made in ordinary indoor clothing without boots.

Since about half the total school population was measured, and since the schools were representative and were situated in all areas of the county, the resulting figures may be taken as representative of the height and weight of children in this part of the county.

Tables I and II have been constructed to show mean weight and height at ages for each sex together with standard deviations and coefficients of variation for each age group. The coefficients of correlation and the regression of weight on height for each age group have also been calculated. The age shown represents the midpoint of each group, thus, the age 8 group consists of those children whose ages range from over 7 years and 9 months up to and including those of 8 years and 3 months. Similarly the ages in the comparative tables represent in all cases the midpoint of the group.

HEIGHT.

A study of the observations of height in both sexes (Tables I and II) shows that girls in this area are taller than boys from about age 10 to 14 years (the limit of the observations). Below 10 years in most groups the boys are taller than the girls. For instance in the age groups 5 to 9.5 the boys are on the average 0.20 in. taller; at 10 to 11 $\frac{1}{2}$ the girls are 0.24 in. taller and at 12 to 14 the girls have an advantage of 0.96 in. The differences in the rate of growth can be clearly seen in the following figures where comparison of the observations is made with published data from East Sussex (*vide* Dunstan, 1925).

<i>Increase in height.</i>				
Age	Boys		Girls	
	Isle of Ely	East Sussex	Isle of Ely	East Sussex
Total increase in inches.				
6-9	6.6	6.2	6.5	6.1
9-13	8.3	7.3	9.5	8.8
Mean increase in inches per year.				
6-9	2.20	2.07	2.16	2.03
9-13	2.08	1.83	2.38	2.20

In both areas the average annual increase in height differs very little up to age 9 between the two sexes; on the whole the boys grow slightly faster. From

age 9 to age 13 the rate of increase is distinctly greater in girls. In all cases the increases are greater in the Isle of Ely than in East Sussex.

Table I. *Isle of Ely. Boys.*

Age in years [age shown is midpoint of group] (1)	No. of observations (2)	Height in in.			Weight in lb.			Coefficient of correlation between height and weight (9) +	Coefficient of regression, weight on height (10)
		Mean (3)	Standard deviation (4)	Coefficient of variation (5) %	Mean (6)	Standard deviation (7)	Coefficient of variation (8) %		
4-5	18	41.36	1.56	3.8	39.08	3.10	7.9	—	—
5-0	92	41.32	1.67	4.0	39.26	4.46	11.4	0.5510	1.47
5-5	132	42.70	1.73	4.1	42.29	4.28	10.1	0.7336	1.82
6-0	126	43.43	2.08	4.8	43.84	5.22	11.9	0.8069	2.03
6-5	112	44.65	1.88	4.2	46.58	4.65	10.0	0.7405	1.82
7-0	156	45.94	2.07	4.5	48.66	6.52	13.4	0.8047	2.53
7-5	140	46.94	2.04	4.4	50.68	6.01	11.9	0.7942	2.33
8-0	156	48.22	2.05	4.3	54.01	6.52	12.1	0.7883	2.51
8-5	150	49.24	2.00	4.1	56.78	6.54	11.5	0.7244	2.37
9-0	180	50.07	2.12	4.2	59.08	6.60	11.1	0.7702	2.40
9-5	164	51.25	2.09	4.1	62.40	7.25	11.6	0.7014	2.43
10-0	157	51.98	2.29	4.4	64.99	7.97	12.3	0.7227	2.52
10-5	148	52.80	2.28	4.3	66.68	9.12	13.7	0.6954	2.78
11-0	164	53.76	2.35	4.4	70.29	9.62	13.7	0.7601	3.12
11-5	166	54.89	2.23	4.1	74.06	9.35	12.6	0.7463	3.12
12-0	133	55.82	2.59	4.6	78.19	11.57	14.8	0.8189	3.65
12-5	165	57.09	2.98	5.2	83.43	12.64	15.2	0.8419	3.57
13-0	182	58.37	2.96	5.1	89.12	14.95	16.8	0.7926	4.00
13-5	140	58.81	3.09	5.3	91.25	14.95	16.4	0.8777	4.25
14-0	104	59.34	2.64	4.5	93.64	13.62	14.6	0.8232	4.25

Table II. *Isle of Ely. Girls.*

Age in years [age shown is midpoint of group] (1)	No. of observations (2)	Height in in.			Weight in lb.			Coefficient of correlation between height and weight (9) +	Coefficient of regression, weight on height (10)
		Mean (3)	Standard deviation (4)	Coefficient of variation (5) %	Mean (6)	Standard deviation (7)	Coefficient of variation (8) %		
5-0	51	40.86	1.74	4.3	38.21	3.96	10.4	0.8606	1.96
5-5	104	42.13	1.86	4.4	40.10	4.50	11.2	0.7857	1.90
6-0	114	43.28	2.05	4.7	41.90	4.85	11.6	0.7431	1.76
6-5	116	44.93	1.93	4.3	45.96	6.35	13.8	0.7162	2.36
7-0	128	45.61	1.88	4.1	46.55	5.20	11.1	0.7595	2.10
7-5	120	47.16	2.01	4.3	50.50	7.21	14.3	0.7388	2.65
8-0	121	48.21	1.90	3.9	53.08	7.31	13.8	0.8220	3.17
8-5	118	48.90	2.04	4.2	54.03	6.66	12.3	0.7761	2.53
9-0	145	49.73	2.49	5.0	56.73	8.82	15.5	0.7707	2.74
9-5	121	50.99	2.50	4.9	60.31	9.88	16.4	0.7581	3.00
10-0	159	52.01	2.48	4.8	63.63	9.98	15.7	0.7036	2.84
10-5	131	53.02	2.62	4.9	66.56	11.40	17.1	0.7846	3.41
11-0	155	54.00	2.93	5.4	72.06	14.50	20.1	0.7712	3.82
11-5	146	55.35	2.88	5.2	75.06	13.18	17.6	0.7964	3.64
12-0	133	56.85	2.87	5.0	80.18	14.02	17.5	0.7239	3.54
12-5	155	57.90	2.79	4.8	85.93	17.49	20.4	0.7422	4.65
13-0	176	59.23	2.92	4.9	91.17	16.50	18.1	0.8065	4.56
13-5	109	59.40	2.66	4.5	92.07	14.60	15.9	0.6657	3.65
14-0	88	60.85	2.28	3.7	99.41	15.11	15.2	0.5843	3.87

WEIGHT.

In weight the boys are found to be heavier than the girls up till the 11th year, but thereafter the position is reversed, and girls are definitely the heavier. These findings are in accordance with those of other observers.

The differences in the rate of growth are shown in the following figures.

<i>Increase in weight.</i>				
Age	Boys		Girls	
	Isle of Ely	East Sussex	Isle of Ely	East Sussex
Total increase in pounds.				
6-9	15.2	13.0	14.8	13.3
9-13	30.0	21.8	34.4	27.0
Mean increase in pounds per year.				
6-9	5.07	4.33	4.93	4.44
9-13	7.50	5.45	8.60	6.75

The mean increase is slightly greater in boys than in girls in the Isle of Ely figures during the 6-9 period but the reverse is the case in East Sussex. In both areas the increase is distinctly greater in girls of 9-13 compared with boys of the same age. As with height there is a greater increase in both sexes and in both age groups in the Isle of Ely than in East Sussex.

VARIABILITY OF HEIGHT AND WEIGHT.

In both sexes, with increase in age, there is a greater scatter of the observations around the mean, especially in the observations of weight. Weight, in fact, at each age is much more variable than height, and the degree of variability increases with age, somewhat more noticeably in the case of girls. There is a high correlation between weight and height at these ages. The coefficients for each age are shown in Tables I and II. They differ but slightly at different ages or between the sexes.

REGRESSION OF WEIGHT ON HEIGHT.

Column 10 in Tables I and II gives the average increase in weight per inch of height at each half-year (the calculated regression coefficient). It will be seen that the average increase in weight for each inch of height becomes greater with age, but the increase is not uniform, an observation in accord with common knowledge. It may also be noted that the period of maximum increase in weight for each inch of height occurs at a later period in boys than in girls. This is again in accordance with other observations. Girls in most age groups show a greater average increase in weight for a unit change in height than boys.

The observed regression of weight on height irrespective of age, *i.e.* the mean weight for each inch of height, is shown in Tables III and IV. The figures show that except at heights 56.75 and 57.75 in. boys are heavier than girls at any given height. The fact that these weight for height figures, irrespective of age, show that boys are heavier than girls, while in the separate age groups the older girls are heavier and taller than the boys, can probably be explained by the earlier onset of puberty in girls, and in consequence increased growth in their case from round about the 12th year. It is a pity that figures were not available for children of the elementary school class for the higher

ages up to about 18 years. Changes beyond the age of 14 years would be of considerable interest.

Table III. *The Isle of Ely. Standards of weight per inch of height. Boys.*

Number of observations	Height in inches	Mean weight in lb.	Standard deviation of weight	Nutritional quotient = W/H
15	38-75-	36-65	1-67	0-93
37	39-75-	36-87	2-17	0-92
77	40-75-	39-06	2-57	0-95
91	41-75-	40-92	2-53	0-97
115	42-75-	42-82	2-87	0-99
107	43-75-	45-27	3-01	1-02
117	44-75-	46-91	3-28	1-04
112	45-75-	49-30	3-03	1-07
142	46-75-	51-76	3-72	1-10
145	47-75-	54-23	3-68	1-12
166	48-75-	56-80	4-65	1-15
179	49-75-	59-36	4-12	1-18
173	50-75-	61-96	4-33	1-21
178	51-75-	65-49	4-44	1-25
149	52-75-	68-36	4-99	1-28
147	53-75-	72-10	5-70	1-33
151	54-75-	75-21	5-98	1-36
155	55-75-	79-06	8-01	1-41
125	56-75-	82-93	7-17	1-45
111	57-75-	86-30	7-37	1-48
88	58-75-	92-34	8-05	1-56
84	59-75-	95-52	8-18	1-59
47	60-75-	100-55	10-68	1-64
32	61-75-	104-28	11-92	1-68
18	62-75-63-74	109-19	7-99	1-73

Table IV. *The Isle of Ely. Standards of weight per inch of height. Girls.*

Number of observations	Height in inches	Mean weight in lb.	Standard deviation of weight	Nutritional quotient = W/H
20	38-75-	34-35	1-55	0-87
41	39-75-	36-42	2-17	0-90
50	40-75-	38-37	2-66	0-93
75	41-75-	40-02	2-73	0-95
78	42-75-	41-93	3-09	0-97
98	43-75-	44-03	2-79	1-00
89	44-75-	46-12	3-22	1-02
119	45-75-	47-89	3-64	1-04
135	46-75-	50-20	3-39	1-06
139	47-75-	52-35	3-98	1-08
107	48-75-	55-31	4-70	1-12
139	49-75-	57-86	5-03	1-15
144	50-75-	61-18	6-03	1-19
118	51-75-	62-90	4-91	1-20
123	52-75-	66-05	6-60	1-24
111	53-75-	70-67	7-35	1-30
109	54-75-	73-67	9-60	1-33
119	55-75-	77-80	9-16	1-38
97	56-75-	84-07	11-02	1-47
117	57-75-	88-70	11-53	1-52
102	58-75-	92-25	12-21	1-56
76	59-75-	94-36	11-98	1-57
75	60-75-	100-05	11-08	1-63
59	61-75-	102-00	11-62	1-64
28	62-75-63-74	108-50	15-21	1-72

COMPARATIVE FIGURES.

In Tables V–VIII the observations from the Isle of Ely are compared with figures from other areas. The most noticeable feature is the superiority of the Isle of Ely children both as regards height and weight, more especially at the higher ages.

Table V. *Boys. Height in inches.*

Ages in years	Isle of Ely	Tuxford and Glegg, 1911		Dunstan, 1925 (East Sussex)	McKinlay, 1924 (Glasgow)	Leeds Report, 1930	Board of Education Anthrop. Committee
		England	County areas				
5	41.32	—	—	40.79	—	—	41.4
5½	42.70	40.55	40.63	41.83	—	41.6	—
6	43.43	—	—	42.71	—	—	43.0
6½	44.65	42.52	42.76	43.87	—	44.3	—
7	45.94	—	—	44.95	—	—	45.4
7½	46.94	45.16	45.39	45.97	—	46.8	—
8	48.22	—	—	47.13	46.25	—	47.8
8½	49.24	46.97	47.05	48.24	—	47.6	—
9	50.07	—	—	49.04	47.77	—	49.2
9½	51.25	49.09	49.84	50.33	—	49.8	—
10	51.98	—	—	50.91	49.96	—	51.3
10½	52.80	50.95	51.18	51.63	—	51.5	—
11	53.76	—	—	52.63	51.67	—	52.7
11½	54.89	52.84	53.23	53.58	—	54.2	—
12	55.82	—	—	54.51	52.71	—	55.0
12½	57.09	55.04	55.20	55.54	—	54.8	—
13	58.37	—	—	56.38	54.71	—	56.2
13½	58.81	56.10	56.14	56.88	—	57.1	—
14	59.34	—	—	58.00	—	—	58.0

Table VI. *Boys. Weight in pounds.*

Ages in years	Isle of Ely	Tuxford and Glegg, 1911		Dunstan, 1925 (East Sussex)	McKinlay, 1924 (Glasgow)	Leeds Report, 1930	Board of Education Anthrop. Committee
		England	County areas				
5	39.26	—	—	38.23	—	—	38.7
5½	42.29	38.58	38.96	40.54	—	40.2	—
6	43.84	—	—	41.71	—	—	41.3
6½	46.58	42.52	42.57	43.65	—	44.0	—
7	48.66	—	—	45.46	—	—	45.4
7½	50.68	46.64	47.23	47.94	—	50.0	—
8	54.01	—	—	50.26	50.85	—	51.0
8½	56.78	50.29	51.26	53.56	—	53.8	—
9	59.08	—	—	54.63	55.44	—	54.8
9½	62.40	55.26	56.89	58.26	—	58.5	—
10	64.99	—	—	59.36	60.55	—	59.6
10½	66.68	60.32	61.05	61.88	—	63.2	—
11	70.29	—	—	64.92	65.02	—	64.6
11½	74.06	65.84	67.71	67.72	—	72.0	—
12	78.19	—	—	70.36	68.40	—	71.6
12½	83.43	72.71	73.28	73.87	—	74.2	—
13	89.12	—	—	77.21	74.99	—	76.5
13½	91.25	77.33	77.70	79.08	—	82.1	—
14	93.64	—	—	85.40	—	—	86.1

For instance in comparison with the observations of the Board of Education Anthropological Committee (1927, *The Health of the School Child*, p. 138), the Isle of Ely children are on the average slightly less in height at the initial age, 5 years, but at ages 6–8 are approximately half an inch taller, at ages 9–12

three-quarters to an inch taller, and at ages 13–14 between one and two inches taller. Similarly the Isle of Ely children do not differ materially in weight at age 5 from the children measured by the Anthropometric Committee, but at ages 6–8 are some 2–3 lb. heavier, at ages 9–12 between 4 and 6 lb. heavier, and

Table VII. *Girls. Height in inches.*

Ages in years	Isle of Ely	Tuxford and Glegg, 1911		Dunstan, 1925 (East Sussex)	McKinlay, 1924 (Glasgow)	Leeds Report, 1930	Board of Education Anthrop. Committee
		England	County areas				
5	40·86	—	—	40·32	—	—	41·1
5½	42·13	40·39	40·59	41·54	—	41·4	—
6	43·28	—	—	42·65	—	—	42·8
6½	44·93	42·36	42·52	43·43	—	43·5	—
7	45·61	—	—	44·43	—	—	45·1
7½	47·16	44·84	45·12	45·90	—	46·4	—
8	48·21	—	—	47·17	46·00	—	47·5
8½	48·90	46·30	46·38	47·88	—	47·9	—
9	49·73	—	—	48·89	47·88	—	48·9
9½	50·99	48·70	49·45	49·50	—	49·8	—
10	52·01	—	—	50·75	49·57	—	51·2
10½	53·02	51·10	51·26	52·02	—	51·4	—
11	54·00	—	—	52·83	51·13	—	52·8
11½	55·35	52·56	53·39	53·81	—	53·9	—
12	56·85	—	—	55·18	53·38	—	55·6
12½	57·90	54·61	54·53	56·46	—	55·6	—
13	59·23	—	—	57·84	56·00	—	56·9
13½	59·40	56·89	57·12	58·56	—	57·3	—
14	60·85	—	—	59·77	—	—	58·9
14½	—	58·66	58·98	—	—	—	—

Table VIII. *Girls. Weight in pounds.*

Ages in years	Isle of Ely	Tuxford and Glegg, 1911		Dunstan, 1925 (East Sussex)	McKinlay, 1924 (Glasgow)	Leeds Report, 1930	Board of Education Anthrop. Committee
		England	County areas				
5	38·21	—	—	37·50	—	—	37·5
5½	40·10	37·55	37·88	39·38	—	38·9	—
6	41·90	—	—	41·36	—	—	40·1
6½	45·96	40·88	41·02	42·12	—	42·5	—
7	46·55	—	—	45·00	—	—	44·4
7½	50·50	44·89	45·19	47·39	—	48·6	—
8	53·08	—	—	49·44	49·48	—	49·4
8½	54·03	48·82	48·88	51·22	—	52·0	—
9	56·73	—	—	53·40	53·91	—	52·6
9½	60·31	54·44	55·22	56·57	—	56·5	—
10	63·63	—	—	58·82	57·39	—	59·8
10½	66·56	58·66	59·27	62·55	—	62·3	—
11	72·06	—	—	64·57	61·29	—	63·9
11½	75·06	65·08	66·68	68·20	—	70·0	—
12	80·18	—	—	71·29	69·43	—	73·9
12½	85·93	73·72	74·45	75·34	—	75·9	—
13	91·17	—	—	81·89	78·48	—	79·0
13½	92·07	79·88	80·94	85·74	—	81·7	—
14	99·41	—	—	88·53	—	—	88·2
14½	—	87·58	88·26	—	—	—	—

at ages 13–14 as much as 11 or 12 lb. heavier. Too much reliance ought not to be placed on the figure for any single group, but there is no doubt as to the general conclusion that, on the average, children in this part of the country are both taller and heavier for their age than those in the other areas for which

figures are available. That this is probably not merely an advantage of country children over town children is shown by comparison with the figures for East Sussex which refer to a rural population, and with Tuxford and Glegg's (1911) "County Area" figures which refer to a predominantly rural population. There is, however, a time factor to be considered. Tuxford and Glegg's observations are over 20 years old, and Dunstan's measurements for East Sussex refer to children born between 1893 and 1910. The Isle of Ely figures refer to children born between 1918 and 1928. It is therefore possible that the superior height and weight in the Isle of Ely are a measure of social amelioration generally, and perhaps of increased interest and care in child life in more recent years. Thus the Board of Education figures show a superiority as regards both height and weight over those of Tuxford and Glegg both for all areas and for county areas only, though the difference is small. It does, however, exist and since the Board's figures are for all areas, rural and urban, the contrary might rather have been expected. It seems, therefore, a fair assumption that height and weight of school children has slightly but definitely improved in the last 20 years. It would be of considerable value to the study of nutrition if a careful and comprehensive study of relative heights and weights now and, say, 20-25 years ago for different types of areas could be made. The average increase in weight and height for all areas over that period could be determined and compared with that in different areas. It is manifestly not sufficient, in support of the view that nutrition in some areas has not been seriously impaired of recent years, to demonstrate that no change in weight and height over a period of time has taken place, or even that a slight increase has been observed, for perhaps a distinct increase might reasonably have been expected in the absence of adverse environmental influences.

But however this may be, it is not probable that the superiority of the Isle of Ely figures can be explained by the fact that the observations are of more recent date. Almost certainly racial factors are also involved. In order to determine the importance of these, it would be necessary to have weight and height figures preferably for all education areas in the country, but certainly for a sufficient selection of areas, so that broad racial groupings could be made and comparisons drawn, not only between different areas, but between rural and urban populations racially differentiated.

It has already been observed that the Isle of Ely children show their maximum superiority in height and weight at the higher ages. It has been suggested to me that clothes may be a factor at the higher ages, but I do not think this is probable. The only article of dress which is rather different in the country as compared with the town is probably boots, which are heavier in the country. Measurements were, however, made without boots. In addition the majority of observers have found that country children are, on the average, taller and heavier than town children, and the Isle of Ely figures when compared with those of Leeds (Wear, 1931) and Glasgow (McKinlay, 1924) bear this out for both sexes and at all periods, but again more distinctly so at the higher ages.

It seems to me that a possible explanation of this increasing advantage at the higher ages is due to an earlier onset of puberty in the rural areas. It would, however, be very difficult to determine this, since puberty is a period and its onset cannot be assigned to any particular week or month.

THE WEIGHT/HEIGHT RATIO.

The simple W/H ratio or nutritional quotient has been set out in Tables III and IV for each height irrespective of age. The ratio for boys is 0.02–0.04 higher on the average than that for girls. It seems to me, however, that this figure is of very limited value. If height be constant it is easier to compare weights, and avoid the calculation of the quotient. If, on the other hand, the W/H ratio is worked out for separate age groups, then the quotient is a figure which is of undoubted significance. As regards, however, preliminary investigation of nutrition such as is required most frequently in a school medical inspection, a quick reference in any doubtful case to a table of weight-height-age (such as Tables I and II), or to a simple weight and height table (such as Tables III and IV), would enable any child differing widely from the standard to be picked out for further examination. Some authorities suggest that weight for height irrespective of age is sufficient as a rough index of nutrition, and do not regard age as being a factor of great importance. If one follows this method, remembering normal variations in weight, one can construct, as is done by Emerson (1930) in America, and by Dunstan (1933) in this country, a minimal weight-height table. In this, an agreed percentage is deducted from the observed mean weight per unit of height and all children who are at or below this minimum weight for their height are noted for further investigation of their nutrition. Thus, I have found that, of the children under investigation in the present study, 8.0 per cent. of the boys and 13.2 per cent. of the girls were 10 per cent. or more below the mean weight for their height. But in whatever way they are utilised, weight and height data can never be more than a rough index of nutrition though a very necessary one. They do, however, give a picture of the "size" of the average child, and, even if they are not malnourished, those that differ widely from the scale are not normal and their condition requires further investigation.

Moreover an accumulation of such data for different areas in this country ought to give indications of racial and no less important economic and environmental differences which, if the influences can be elucidated, must guide the community in its strivings after the general betterment of the race.

In conclusion I wish to record my thanks to Dr R. French, County Medical Officer of the Isle of Ely, for making the investigation possible and for permission to publish the results, and to Dr A. Bradford Hill of the Division of Epidemiology and Vital Statistics of the London School of Hygiene and Tropical Medicine, for much help in checking the figures and in the preparation of the article for publication.

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(*MS. received for publication* 5. I. 1934.—Ed.)