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" THE RELATIVE EFFECTS OF HEREDITY AND ENVIRONMENT ON THE NUTRITION OF THE RURAL ELEMENTARY SCHOOL CHILD "

A THESIS

BY

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When the Medical Inspection of Public Elementary School Children became compulsory, there was introduced into the field for investigation, a large amount of material of great value, affording as it does a study of physical and mental conditions in a very varied class of subjects.

That the material was available before the Act made Medical Inspection compulsory is of course admitted, and many valuable memoranda dealing with a diversity of conditions in the Elementary School Child were written previous to the Act. By the passing of such a social measure, the material was increased out of all proportion to the extent to which it was previously recognised, and with the institution of the Medical Inspection vast compilations of figures have been made, reflecting conditions of physical and mental as well as social and economic interest, which if previously contemplated were not at all fully considered. For instance;--- One did not know previously how very abundant were errors of refraction affecting the eyesight of such an enormous number of school children. Previously only the child with marked defect came to be dealt with. One did not know that carious teeth were so prevalent in elementary school children at the age of 13, as to render the search for a sound set of teeth one of some difficulty. One did not know that verminous conditions of the head exist to such an extent as to almost balance the proportion of clean heads.

Thus it comes about that we are now in a position to say something definite about the Elementary School Child, whereas formerly we had a very indefinite conception of him from a physical standpoint.

Thesis

I have chosen as the subject of this ~~memorandum~~ "The relative effects of heredity and environment on the nutrition of the rural elementary school child." The case of heredity versus environment must have become almost as hopelessly dull as did that of Jarndice and Jarndice in "Bleak House," but I have introduced into this controversy a subject which eugenists previously have ignored; i.e. Nutrition, in the hope that originality of research may be apparent in such a discussion.

I at once appreciate the difficulty of giving a definition of nutrition. I think it would much easier to say what good nutrition and bad nutrition do not mean, than what they do mean. Good nutrition means neither fatness nor leanness, bigness nor littleness. On the one hand we have the chubby rosy-cheeked child, with bright eyes, elastic skin, hair of good lustre and abundant. This probably represents the highest degree of good nutrition. On the other hand, we have the lean cadaverous type, with expressionless face, sunken eyes, and lustreless hair. Or we may have the flabby rachitic child, with stunted growth, inelastic skin, and misshapen head and thorax. These represent the extremes of bad nutrition. Between these extremes of good and bad are many varieties as we ascend or descend the scale.

Thesis

I am refraining from bringing into this ~~memorandum~~ much mathematical data in the shape of statistics. I am only too conscious of the small value that attaches to much of the statistical matter which is frequently presented. I know that it is possible, I could readily do it here, to bring forward on the same page, data relating to a thousand children to prove any or all of a series of contentions, and also data to disprove the same. Too often the statistician sets about getting figures to prove what he already is convinced is indisputable, and how could such

figures be altogether free from the manipulation of a biased mind. Statistics as they are given us at present are not reliable. The only figures on which reliance can be placed are figures dealing with a whole and not any component part. I suggest that the only dependable figures are those which are interpreted by a mathematician independent of ~~his~~ the source or destination of ~~his~~ the figures. Such figures require to be dealt with mathematically by such methods as are practised in the Registrar General's Department.

The figures I give relate to such numbers as to reduce errors to a minimum. They also deal with a whole and not with an intregral part. They are the average height and weight of the Elementary School Children of the County of Wiltshire, at the various ages of school attendance. The collection of these figures and the calculations involved in the production of the ultimate averages has been a work of much magnitude. I think that errors have been excluded to such an extent as to render the figures of considerable accuracy, and therefore of interest. They relate to some 34,000 shildren of a population which is singularly uniform. Wiltshire people are engaged almost exclusively in the farming industry, and the vast number of children are the offspring of agricultural labourers who are the descendants of agricultural labourers, for generations back. I have divided the county up into its sanitary areas and have given the heights and weights of boys and girls at each age period from 4 to 14, for each sanitary area. In some of these areas wages are relatively high, and in some relatively low. In some areas housing is relatively good, and in others relatively bad. Some areas are mostly on the chalky downland, others are on the marl of the fertile valleys.

Appended to the figures I give a short analysis.

Besides the figures I give a series of cases, and in order that these might not be selected fairly, I adopted the following method. On several consecutive days, I made notes on every case that was presented to me for routine Medical Inspection, where (1) the child was an offspring of parents whose wages were less than 14/- a week, and (2) the child was badly nourished. I made separate classes of the two varieties, and if a child belonged to either it was jotted down. I let no other circumstances whatever influence me in the collection of these cases, and arrogate to myself the character of being scrupulously fair in their collection. The fact that they were consecutive should make their significance almost indisputable. It is natural to conclude that occasionally, one might almost argue most frequently, in a county with a low wage scale, individual cases will belong to both classes. How much this is thecase will be apparent from a perusal of the small history attached to each. I will not discuss or analyse the features until I have put the reader in possession of the facts, so that he may after reading have opportunity to draw his own conclusions.

Let it be understood now that I do not lay down any dogmatic view discrediting the influence of either heredity or environment in matters of nutrition, but this I do state and thoroughly believe i.e. that environmental influence is governed by the law of heredity. I am perfectly conscious of the fact that in beings of similar endowment, differences of environment have a potent influence. I have seen the effect of change of circumstances on both the healthy child and the feeble child, and have marked how often the removal of a poorly developed child from unfavourable surroundings to better conditions of life, is followed by a beneficial change in the child's nutritional and developmental state. I am, however, emphatically of opinion

that the change on the one hand of the child of poor hereditary endowment, and on the other hand of that of the child of good hereditary endowment, ~~is~~ are entirely disproportionate, so entirely disproportionate as to impress the fact that environmental influence is governed by a law and that the law of heredity. On the one hand there is comparatively little scope. On the other hand there is unlimited scope.

It has been very remarkable to me in a study of the social conditions of the people, how very often one finds truly good nutrition amongst the children of those people who occupy almost the lowest rung of the social ladder. I can recall visiting with an officer of the National Society for the Prevention of Cruelty to Children, a family who had been for a long time under the observation of the Society. The house was one of poverty and filth which almost beggars description. The cupboard was empty, a frequent occurence, and the gaunt spectre of want was in absolute possession. Leniency was practised by the Society because the family was known to be in very impoverished circumstances. There was no real bread-winner. A drunken and dissolute son who worked spasmodically was the ostensible bread-winner. The mother was notoriously incapable, one of those helpless creatures who let things slide, and prefer gossip and the ale-house to domestic juggling. Thus it was that the children were sadly neglected and had "to do" for themselves to a great extent. They were highly verminous both in body and head, lice being abundantly present. The bedding on which they slept was rotten and disintegrated by evacuations. So notorious was their state that the mother after being offered the shelter of the workhouse for herself and the children, and refusing, had the children taken from her, and was herself sentenced to three months hard labour. In such awful surroundings - they could not have been worse - one would have expected to find the childrens' nutritional and general development very much impaired. But it was not, I had

the younger members of the family stripped, and must confess to being astounded at the very excellent state of nutrition of all of them. They were plump, elastic of skin, and had healthy complexions, and would have done credit to infinitely better surroundings than those they occupied. Had they been clean, and had the house been clean, one could not have refrained from declaring that the mother was achieving results which were highly creditable. But in the knowledge that those children were grossly neglected, one could but come to the conclusion that heredity was exerting her influence to such an extent, that so far as nutrition was concerned, she was combating successfully the influences of environment.

I have entered into this case in detail, because it almost formed a text for me. So impressed was I by what I saw thatI began to pay considerable attention to the nutrition of the Elementary School Child, and in this memorandum I am embodying my impressions.

Now how often do we find examples of good nutrition in the children of the working classes on low scale of wages? In Wiltshire, quite as frequently as in the classes where wages are relatively large. This assertion, it may be contended, is not supported by any figures relating to this point.(I have already made my statement about statistics. Nothing would have been easier than the collection of a series of cases giving scales of wages and nutritional development in each case. Nay more it would be possible to collect a series of cases to give credence to the idea that the children brought up on a small wage scale, were of a better nutrition than those brought up on a good wage scale.) I refer the reader to the tables of Heights and Weights on Pages 29 & 36 . It is there obvious that there is no great disparity between the heights and

weights of the children in the Pewsey area, where the wages are relatively low, and where housing is bad, and the Malmesbury area where wages are relatively high and where housing is better. (I am not forgetful of my definitions of good and bad nutrition, in which I state that good nutrition does not mean bigness or littleness, fatness or leanness, but as a general broad principle, height and weight figures mey be taken as indicative of the general development.) Exactly the same applies to children of classes at the other end of the scale. Defective nutrition is as abundantly apparent in the children of the comparatively richer classes, as it is in those of the labouring classes existing on wages of 13/- a week. I have seen large families who have been reared on such a wage, exhibiting such signs of praiseworthy nutrition as to elicit eulogies for great thrift and ingenious management, and yet it was abundantly apparent that like Topsy they had "Just growed". When children had followed each other in rapid succession, there was often evidence in the younger members of the family that the vital resource of the parent had been over-taxed, but this was as much in evidence in the off-spring of the comparatively rich, as that of the comparatively poor.

A casual glance at children is very misleading. When funds are small and families are large, it is accepted that individual attention on the part of the mother is severely handicapped. The children come to school in ragged and insufficient clothing; Their boots are out of repair; and very often the evidences of lack of the application of soap and water are abundant. Such children always compare unfavourably with children who are better clad, better booted, and who have received the mother's individual attention in matters relating to cleanliness and decoration. It would only be fair to compare the children in the nude state after they had been bathed and

each had received the same individual attention.

Wiltshire is a very favourable county in which to draw nutritional comparisons. The vast majority, in fact one might say all, of the people belong to the Anglo-Saxon race. The industry of rural ~~Webs~~ Wills being almost exclusively agricultural, the people are nearly all of the farmer and farm labouring classes. Thus we have uniformity. The Wiltshire labourer does not migrate much, except within the confines of his own agricultural area. The present-day labourer is usually the descendant of labourers who were the descendants of labourers for generations back. The stock is a pretty hardy one, but is somewhat lacking in energy. They are quite an apathetic people, and intelligence is not a marked feature. The mode of life is essentially simple. Inter-marriage is fairly frequent. Illegitimacy is fairly high; in some districts it is markedly so.

Often in a country village one or two surnames predominate to a great extent. The names are often peculiarly Wessex in type, and the accent of the people is markedly Wessex.

The housing is poor, and insanitary conditions of the homes abound. Food is of the simplest variety, and it may at once be said that bread and vegetables form the staple dietary. How often I am told that the breakfast, dinner, and supper of the Elementary School Child consists of bread and butter. "Cooked dinners" as a rule consist of a compôte of vegetables with the addition of some form of fat, often melted lard. Animal food is conspicuous by its absence. How can it be present on a wage of 14/- a week with frequently ten mouths to provide for?

Mr. Rowntree in his "Poverty, A Study of Town Life" gives a certain dietary as the cheapest on which effiency is obtainable. It is less generous than the Local Government Board scales of dietary for workhouses in as much as it does not

contain meat. He calculates upon a scientific basis the amount needed for men and women and for children of different ages, and from this deduces an average of 3/- for a man or woman and 2/3 for a child as the minimum necessary cost of food. Mr. Rowntree's investigations were made in York. His figures could well be used for Wiltshire, because provisions in Wiltshire are on the whole dearer, but vegetables, being grown in the gardens of Wiltshire labourers, are much cheaper.

Mr. Mann in his study of the village of Ridgemount in Bedfordshire, accepts Mr. Rowntrie's figures, and furnishes a table which maps out the expenditure per week.

Food	3/- per adult.
,,	2/- ,, child.
Rent	equalised by garden produce.
Firing	1/- per household.
Sundries	2d. per head.
Dress adult	6d. per week.
,, child	5d. ,, ,,

It is claimed for these figures that they are estimated as the very lowest on which with the most judicious and economical expenditure efficiency is possible.

The following table gives the minimum necessary income for families of various sizes.

	Food.		Dress, Fuel and Household sundries.		Total.	
	s.	d.	s.	d.	s.	d.
1 Adult.	3.	0.	1.	8.	4.	8.
2 Adults.	6.	0.	2.	4.	8.	4.
3 ,,	9.	0.	3.	0.	12.	0.
4 ,,	12.	0.	3.	8.	15.	8.
5 ,,	15.	0.	4.	4.	19.	4.
2 ,, 1 child.	8.	3.	2.	11.	11.	2.
2 ,, 2 chrn.	10.	6.	3.	6.	14.	0.
2 ,, 3 ,,	12.	9.	4.	1.	16.	10.
2 ,, 4 ,,	15.	0.	4.	8.	19.	8.
2 ,, 5 ,,	17.	3.	5.	3.	22.	6.
2 ,, 6 ,,	19.	6.	5.	10.	25.	4.
2 ,, 7 ,,	21.	9.	6.	5.	28.	2.

	s.	d.	
For every child	2.	10.	is added.
For every adult	3.	8.	is added.

Rent is not included in the above table because it is easily equalised by garden produce. In a great majority of cases Wiltshire labourers have their rents free, but quite a substantial minority have rents to pay for cottages. In certain areas this is becoming more common, as the older cottages are unhabitable, and new ones are not being built, so the labourer has to find a cottage at a weekly rental in the villages and small towns. If we take the rental as averaging 1/- a week, seeing this is equalised by garden produce, we might deduct it from the totals already estimated. Our totals then become:---

		Totals. s.	d.
1 Adult.		3.	8.
2. Adults.		7.	4.
3 ,,		11.	0.
4 ,,		14.	8.
5 ,,		18.	4.
2 ,,	1 Child.	10.	2.
2 ,,	2 Children.	13.	0.
2 ,,	3 ,,	15.	10.
2 ,,	4 ,,	18.	8.
2 ,,	5 ,,	21.	6.
2 ,,	6 ,,	24.	4.
2 ,,	7 ,,	27.	2.

I ~~alive~~ have given the two tables separately, because Wiltshire is not a county by any means in which the agricultural ~~la~~ labourer is living cottage free. The second table, if applied to the whole population, is a very generous interpretation of the conditions. Now it will at once be apparent that many of the Wiltshire families must be living in a state of primary poverty. Largeness of family and smallness of wages are potent causes of poverty throughout the county. If I were to state that the average wage of the agricultural labourer in Wiltshire was 14/- a week, with a cottage, I would be rather over-estimating his financial position than underestimating it. If this is applied to the tables what then do we find? We find that when the family of an agricultural labourer in Wiltshire exceeds two (granting they are young and not earning) the family is existing in a state of primary poverty. What then are the economic conditions of the large families I know to exist in a small community in the east of Wiltshire, where the wages are 12/6 a week and no cottage is provided? I will have occasion to refer later to the

state of nutrition of some of the children of such families attending the Elementary Schools. Some are in a bad state of nutrition, but by no means all. Some are good, good beyond the possibility of for one single moment considering that their nutritional state has much relation to environment. It was in such families that one saw the demonstration of the law of the survival of the fittest. If the stock were poor, the children were often of very inferior nutrition. If the stock were good, the nutrition seemed to suffer little or no detriment from the pinched conditions of life that were of necessity in great prominence from day to day; in fact short of starvation these children of good stock maintained a healthy physique.

It would perhaps here be well to state what probably represents the environment of the great majority of children attending the Public Elementary Schools throughout the county. There is little of the feature of modernity about the housing of the working classes of Wiltshire. Most of the housing is of a pattern which falls far short of modern hygienic requirements. The rooms are small, and the windows are usually very tiny affording little light to penetrate to the interior. Often these windows are not made to open. If they are, too often no advantage is taken of the feature, and they remain shut the whole of the day and night. I have walked through many villages counting the open windows, and it was an invariable rule to find that the living-rooms which were occupied during the day, had ~~invariably~~ their windowsshut. In these older houses very little has been done in the way of ventilating the space beneath the floor, and damp courses in the walls are never present. The average house will consist of four rooms, two of which are bedrooms These bedrooms are often the space that is occupied between the ceiling of the ground floor-room, and the sloping roof-joists.

The windows of those bedrooms are usually of the dormer type, and are so hidden by thatch that it is impossible for sunlight, at any period of the day, to penetrate to the bedrooms. In the vast majority of the villages thatched cottages are the order. In many of these thatched cottages fleas abound. The bedding is not the least unhygienic part of the household. When families are large over-crowding is not unexceptional. How can it be otherwise with such limited accomodation as these Wiltshire cottages afford? In these bedrooms are huddled together, often in the same bed, three or four children of more or less tender years, and it is only natural that there should be frequent soiling of the bed from evacuations, Soon the supply of clean and fresh material is exhausted, and it comes about that children sleep in beds which are really in a very repulsive state. I state it as a fact, that over and over again, whilst visiting with officers of the N.S.P.C.C., I have seen bedding so rotten as to be falling asunder. These of course, were exceptional conditions.

Let us now look at the surroundings of some of the cottages. The cottages are in one of two situations; i.e. on the downs, or in the valleys. Naturally the demand for labour being greater in the fertile valleys than on the downs, the great majority of the cottages are in the valleys. What then are the surroundings? They are none too favourable. Often the situation is very damp, and no protection is afforded the walls from becoming water-laden. Usually there is a shallow well in a ~~cultured~~ cultivated garden, unprotected from contamination. This is ~~his~~ the only drinking-water supply. Very often the drinking-water is taken from an open pit into which drain the surface waters of highly fertilised lands. In the neighbourhood of the cottages frequently are collections from the stable and cowsheds, and the offensive odours from piggeries and fowl-runs are by no means the least objectionable

feature of the environment.

I have given an acoount of what the home-life of these school children is. It is not an exaggeration, but a really true account of the environment in which the vast majority of the children dwell. The life of those country dwellers is not the charming idyll that one imagines it to be, if one believes the literature of the authors, who love to tell us of the beauties and healthy atmosphere of the cabbage-patch cottages, with their roses and honeysuckle. The children of such a population spend the greater part of their day in an environment of greater or lesser squalor. It is true that the adult population, especially the father, leads and open air life, but then so do innumerable adults who are slum dwellers in our great cities; and I do not imagine that a man street-paving in St. Paul's Churchyard is atmospherically much worse off than a man spreading manure on Marlborough Downs. It is with the environment of the home and its social and economic conditions that we are concerned.

I give an extract taken from an article which appeared in the "The Daily News of 1900." It was entitled, "The Woes of Wiltshire". I donot think that the Wiltshire of to-day is much better off than it was then.

"And now let us glance at the cottages themselves. In the district I have been to-day, there is a much higher average of bad cottages than in any districts I have visited so far. I have seen some cottages to-day as bad as any of the huts I know of in the wildest parts of Ireland and of Wales. Mud and thatch appear to be their chief constituents. Low, old, close, and dirty, many of them are abominations of decay. If a decent man kept fowls or pigs in some of them, he would take good care that his best friends did not know it. A great many of them only

possess one bedroom and that is only a noisome loft, charged and drenched with moisture from the rotten and morbid thatch. Once, as a lad, I paid a sixpence to see the concomitants of tragedy in the "Chamber of Horrors". To-day I have given some abject and gaping cottagers several shillings to witness the signs of more gruesome tragedies in chambers of equal horror. I have been into a number of bedrooms. In several cases even the offer of a shilling failed to secure me admission; for, with crimson blushes, I was told they were not fit for a gentleman to see. "They be more like pigstyes upstairs than bedrooms even for poor folk like us", said one poor old soul. I more than agree with her. Rough hewn stakes are the rafters and the flooring is of wedge-split trees. Sawn, smooth boards were rare in the cottages into which I went. As for the dimensions of the bedrooms, in most of my cases, they are so small that four out of five feet of the floor space is occupied with human beings when the families go to bed. As to ventilation, it is not even dreamt of as a sanitary requirement. Draughts through the floor, draughts through the roof, draughts through the often paneless windows are its casual substitutes.

One or two of the cottages were entirely destitute of sanitary convenience. The tenants in these cases have to either get the permission of their neighbours, or to adopt methods which would get them three months' imprisonment if adopted in a town."

As an earnest, I attach some of the census figures for 1901 for the county of Wiltshire. The figures relate to the housing in certain areas, and I have chosen the areas for definite reasons which I will make plain after I have given the figures.

PEWSEY.

Total Tenements 2619; of which 1504 had less than 5 Rooms.

No. of Rooms.	Less than 5 Rooms.	Persons per Tenement. 1	2	3	4	5	6	7	8	9	10	11	12 or more.
1	13	6	3	3	1	-	-	-	-	-	-	-	-
2	194	56	53	33	22	20	5	2	3	-	-	-	-
3	496	37	104	100	86	69	36	31	16	11	4	2	-
4	801	39	149	149	130	110	87	37	26	23	8	-	1

The Pewsey rural area contains perhaps the worst housing in the county. Most of the houses are old thatch cottages, many of them tumbling to decay. Many of the workmen who live in this area have to walk a considerable distance to their work on account of the lack of cottages on the farms. They have to rent a cottage elsewhere. It will be seen that out of 2619 tenements no less than 194 have only two rooms. This compares very unfavourably with Salisbury area. Also note that there are in this scattered rural district no less than 13 single apartment dwellings. In this area, too, wages are perhaps the lowest in the county. Mostly all the villages and farms are in the valley.

WARMINSTER.

Total Tenements 1629; of which 974 have less than 5 Rooms.

No. of Rooms.	Less than 5 Rooms.	Persons per Tenement. 1	2	3	4	5	6	7	8	9	10	11	12 or more.
1	9	7	1	1	-	-	-	-	-	-	-	-	-
2	93	45	32	8	2	3	3	-	-	-	-	-	-
3	499	71	141	102	74	46	32	17	2	11	2	1	-
4	373	18	104	65	67	49	33	20	6	7	4	-	-

Next to the Pewsey area perhaps the Warminster rural district is that in which bad social and economic conditions are most prevalent. In some of the smaller villages in the Warminster district, such as Chitterne and Imber, the social conditions are very bad and the scale of wages is very low. Several of the villages here are on down-land, but the majority are in the valleys. Note the high proportion of houses with less than five rooms! nearly 60%!

MALMESBURY.

Total Tenements 2271; of which 1104 have less than 5 Rooms.

No. of Rooms.	Less than 5 Rooms.	Persons per Tenement. 1	2	3	4	5	6	7	8	9	10	11	12 or more.
1	10	9	-	1	-	-	-	-	-	-	-	-	-
2	141	41	42	17	22	10	7	2	-	-	-	-	-
3	461	30	110	173	64	58	39	19	16	7	2	2	1
4	492	23	90	90	76	70	54	36	27	15	3	3	2

The conditions in Malmesbury are perhaps as good as any in the county. The scale of wages throughout the area certainly averages higher than in any other area. The cottages on the whole are better than in most areas, and certainly contrast very favourably with such areas as ~~the~~ Pewsey and Warminster ~~area~~.

MARLBOROUGH.

Total Tenements 1143; of which 631 have less than 5 Rooms.

No. of Rooms.	Less than 5 Rooms.	Persons per Tenement. 1	2	3	4	5	6	7	8	9	10	11	12 or more.
1													
2	71	23	28	6	5	6	2	1	-	-	-	-	-
3	287	26	66	57	41	32	26	18	5	9	3	4	-
4	273	13	46	44	48	48	33	21	7	5	2	4	2

I have included the population per household in the Marlborough district, because here mostly all the houses are down-land houses, and in most cases the labourers are well paid. It will be seen that the proportion of small tenements is high.

SALISBURY.

Total Tenements 2819; of which 980 have less than 5 Rooms.

No. of Rooms.	Less than 5 Rooms.	Persons per Tenement. 1	2	3	4	5	6	7	8	9	10	11	12 or more.
1	5	7	1	-	-	-	-	-	-	-	-	-	-
2	98	52	31	10	5	-	-	-	-	-	-	-	-
3	194	31	48	41	39	15	11	4	4	-	-	1	-
4	683	47	141	129	122	105	63	37	20	14	4	1	-

Along with the Malmesbury area the Salisbury area is perhaps the best. Much of this area is on the sand or in the pine-wood district. The wages as a rule are pretty good, and the cottages are fair. It will be observed that the proportion of smaller cottages is very much less than in the Pewsey and Warminster areas. The farms are large here and masters are good, and the landlords of quite the most generous type.

(It must be understood that in talking of "good conditions" that the term is used comparatively. None of the housing conditions of Wiltshire could be said to be exemplary, and with the conversion of tilled land into pasture land, there is not the same demand for labour, and therefore not the same need for houses, so that it is exceptional in the rural areas to see new cottages.)

CHIPPENHAM.

Total Tenements 4057; of which 1569 have less than 5 Rooms.

No. of Rooms.	Less than 5 Rooms.	Persons per Tenement. 1	2	3	4	5	6	7	8	9	10	11	12 or more.
1	5	4	-	1	-	-	-	-	-	-	-	-	-
2	135	46	33	26	12	6	5	4	3	-	-	-	-
3	591	68	154	138	86	54	39	30	13	7	-	2	-
4	838	34	151	160	150	133	83	69	33	9	9	5	2

I give the housing in Chippenham as it was in 1901, because recently, that is within the last decade, there have been many new houses built, and it will be interesting to see with the improvement of the environment what has been the effect upon nutrition as revealed by the tables of heights and weights, especially those referring to the younger children. It is safe to assume that the housing condition in this area, as represented above, has undergone considerable changes for the better. Wages in this area are about an average for the county. All the housing is on marl soil of that fertile soil of Wiltshire beyond the region of chalky downland. Much of the land here is pasture land and many of the farms which once went in for more or less ~~in housing~~ intensive cultivation are now laid out in grass. The milk product either goes to ~~or from~~ London, or goes into the condensed milk factories of which there are several in the county, the largest being situated at Chippenham. This laying out of the land in pasture has cut down the demand for labour considerably.

HIGHWORTH.

Total Tenements 3187; of which 1411 have less than 5 Rooms.

No. of Rooms.	Less than 5 Rooms.	Persons per Tenement. 1	2	3	4	5	6	7	8	9	10	11	12 or more.
1	7	6	1	-	-	-	-	-	-	-	-	-	-
2	138	52	47	18	12	1	6	2	-	-	-	-	-
3	361	47	92	80	51	40	26	15	5	3	2	-	-
4	905	51	148	154	157	137	103	77	37	29	7	4	1

It will be seen here that the distribution of the population per home and the size of houses are altogether better than in any of the other areas. In fact, it really should be considered much the best area in the county, because wages rule high on account of many of the Swindon Great Western Railway factory men living in the district, but as many of them men in fact, the great majority of them are of imported blood, it is not well to put too much dependence on the figures of heights and weights attached to this area. The geological formation here is the same as in the Chippenham district.

These tables will give a clear idea of how the population is distributed per household, and the areas I have chosen deal with all the differences of condition, economic, social, geological, which give rise to differences of environment. It will then be useful to compare the tables of height and weight in their different areas and see what are the effects of bad housing, low wages etc. on the average height and weight of a large number of children. Were we to find, for instance, that the Pewsey area had very much lower figures than the Malmesbury area and the Salisbury area, we would come to the conclusion that environment was exerting a very profound influence. If we were to compare them with average figures for England and Wales such as obtained by the British

British Anthropometrical Society in 1883, and found them very much below this, we might say that the bad housing, small wages, etc., of Wiltshire were exercising a baneful influence on the nutrition of the children. As a matter of fact, we shall find that Pewsey in the matter of nutrition is often better than Malmesbury and Salisbury, and that all are sometimes better and sometimes worse than the British Anthropometrical figures. (For comparison I give the latter.)

Comparison with figures which are general for England and Wales with purely Wiltshire figures, is most misleading, and to suppose that anything may be gathered from the comparison is absurd. The general population of England and Wales is anything but uniform. There is a vast diversity of peoples of different nationalities, whose physical development is in different proportion the each from the other.

The people of Wiltshire are a uniform people, and the comparisons I draw subsequently between the populations of the different areas is not therefore between rural and urban children, not between an industrial urbanised area and a scattered rural area, not between populations where racial differences are an abundant source of deviation, but between districts in which the population is as uniform as it is possible for people to be, where the Wessex Anglo-Saxon stock is almost untainted by the introduction of foreign element, and where the uniformity of occupation is as complete as it could well be.

As the Wiltshire child comes to school usually soon after he has reached the age of three, a new environment is thus early thrust upon him i.e. that of the school. And what sort of environment is this? It means that he has often to walk long distances, and in the winter time has often to sit throughout the school hours with damp clothes and wet feet.

His boots are never his best feature. In a few schools provision is made for such contingencies as damp feet, but the almost unexceptional rule is that the child coming to school with wet feet remains unattended to.. Then many of the children bring their dinners to school. These almost invariably consist of bread and butter, or bread and jam, or bread and dripping. In a few schools cocoa is supplied, but in very few.

When County Councils by the Act of 1902 took over the Elementary Schools, the first act of the Wiltshire County Council in regard to school buildings, was to make a survey of the ventilation of the voluntary schools, with the result that every school had by the County Surveyor's advice a system of Bayles ventilators introduced. Previous to that the system of ventilation was by open windows, and the proportion of open window space to floor area was frequently as small as 1/60th. Even now since the introduction of the Bayles system of ventilation, the supply of air in the majority of cases is quite inadequate. What it must have been before is nauseating to contemplate. I have frequently gone into school-rooms where the subjective test of the effect on breathing was sufficient to tell me that the air contained more likely six volumes CO_2 per 1000 volumes air than .6 volume C,O,2 per 1000 air.

The lighting in many of the schools is defective, and the cloak-room and lavatory arrangements are very bad indeed. Most of the rural schools are without any water supply.

Having now given a somewhat exhaustive account of the environment with which my figures deal, I would like to say a little about the heredity of the children with whom I deal. I have already said that the stock is Wessex Anglo-Saxon, and that it has been but little tainted by the introduction of the foreign element. The intelligence of the people is of a low order and they do not seem to advance readily with the times. On the whole they are a very healthy people. They have very considerable powers of resistance, as is shown by their wholesale combat against adverse conditions of life. i. e. poverty and bad housing. They lead an exceedingly regular life and their labours are not too excessive. The worries of city life and commercial manoeuvring do not effect them. Variety does not enter largely into their lives, but there is a total absence of the rush and tear which sooner or later renders existence jaded. They rarely indulge in excesses of any kind. If they did they would immediately be bankrupt. Leading an active open air life as the men do, their muscular development is good, nor is that of the women behind. They have large families to look after in many cases, and with little or no help the home duties become very arduous. They cannot afford to be luxuriant in any sense of the term, and these strenuous conditions of life, although apparently a great hardship, are by no means an evil. They are not of tall stature,-- in fact, the stature would appear to be diminishing. This may be accounted for by the fact that with the great decrease in the demand for labour, the biggest and fittest have had to go further afield to look for work. I do not think that it is in any way to be accounted for by the poor conditions of livelihood, because I have encountered some of the biggest and stoutest children in the poorest families. The mode of life is essentially simple. Working, eating and sleeping sums up his

24 hours for the agricultural labourer of Wiltshire. He practically knows of but little else than what happens in his immediate surroundings. He marries early in most cases, and often has a large family. He is as a rule prolific, and it would seem almost that the smaller his wage is the larger is his family. At any rate the larger his family the poorer he is, and in those cases no restraint is evidently practised, for often when poverty is apparent in every feature of his household, the family continues to multiply. I fear that the smallness of the wage scale prevents many of the younger women and men from marrying, the result being that illegitimacy is rife. Certain small social communities are morally very degraded and have been so for generations. The offspring of illegitimates themselves illegitimates breed, who in time reproduce their species.

Certain of the smaller communities are almost communities of degenerates. They harbour themselves in small villages to which they have drifted when they have failed to find work owing to incompetence, or lack of the energy to look for it. There they eke out their miserable existence by aid of casual underpaid labour. It is the children of such people who show the deleterious effects of environment, because not only are they half-starved at most times, and wholly starved sometimes, but they are the offspring of a degenerate stock, which in most cases is the product of people who have worked for generations back on the small downland farms at starvation wages. This introduces the problem that a prolongation of bad environment throughout several generations will produce defects, nutritional, etc., on an originally healthy stock. This I would not for a moment deny. I think perhaps this is the very way in which environment exerts its deleterious influence. Getting to work on a less robust member of a robust family generations

back, it has influenced his descendents more and more as his grandson succeeds the son, until it has produced the thorough physical degenerate. The immediate effects on a healthy stock are not apparent, and should that healthy stock reproduce itself in like environmental conditions the effect of environment will not then be apparent. If from the healthy stock, however, there be produced some individual who by an accident of nature has not the excellence of physical endowment as the stock of which he comes, then bad environment gets the chance, and produces its results.

I have mentioned the fact that certain localities exhibit a high degree of physical degeneracy, and in these the social conditions are admittedly very bad. Into such communities have drifted many of the unfit. Their energy, and their physical condition have never allowed of them being able to cope with the exigencies of continuous employment on the farms. They have drifted from one employer to another, but their unsuitability has rendered them incapable of retaining a position for any period, and they have gradually become casual labourers, ekeing out a very casual existence. It is wonderful how such people congregate together. In one small town, called Broadtown, in the north of Wiltshire, a very considerable percentage of the population consists of such people. The school children here are very much below the average nutrition. Moreover they have a most neglected appearance. Many of them are ill-clad, ill-booted, and verminous, and the conditions of their homes are very undesirable. The decidedly inferior development of the children coming from such homes, would at first appear to be due to the very bad home environment. To the home environment undoubtedly are due the neglected appearance, the bad boots, the ragged clothing, the

verminous heads and bodies, and to a certain extent the malnutrition. We must remember however, that these children are mostly of a very bad stock, in which physical and mental degeneracy is abundant, and that the hereditary endowment is one which will not enable the child to make much developmental progress even in better surroundings. When, therefore, we have the child of the physical degenerate in the poorest of environment, we can but expect the worst results. In such communities at the same time, we find children of excellent nutrition, and these are not always the children who come from better homes in which the social conditions are in so called harmony with sound bodily states. Such children frequently come from homes in which the economic conditions are no better than in the homes of the nutritionally unfit, homes in which poverty and bad accomodation are as apparent as in the worst families. They, however, are of good stock, and are endowed with the resistance which is necessary to combat their environment. I could not quote a community in which the feature is better exemplified than that of Broadtown. The atmosphere of the village-school is quite depressing. Case after case of neglect and poverty of body presented itself to me on my visit there, and in each case there was the same history of parental physical decadence. The environment was truly bad, but it was almost as if the heredity were worse. In those cases, however, in which the heredity was better although the environment was still most unsatisfactory, the children were of better nutrition. Such a finding is surely somewhat convincing. To me it is very convincing.

Many of the degenerate casual labour class drift into the larger towns in the county of Wiltshire. The conditions in the poorer schools in these towns is certainly worse than in the

rural districts. A worse degree of poverty is always met with in towns such as Bradford-on-Avon, Trowbridge, Warminster, and Devizes. A reference to the tables of weights will reveal the ~~first trial~~ fact that especially in the later years of school life, The average weight in the urban districts is less than in the rural districts. I attribute this not to the fact that bad housing and density of population is more marked features in the town than in the country. I do not think in Wiltshire that the town houses are worse than the country houses. I know, however, that physical degenerates have massed themselves in the poorer quarters of the towns. They find that casual labour is more readily attained in such places, and to such people a town life has more attractions than a country life. However bad their economics may be, their propagatory resources are almost infinite! Large families are produced in an environment which cannot help them, and coming as they do of a very inferior stock, it is not to be wondered at that the children are of weak and sickly physique.

I have said a good deal about bad stock. Perhaps such impresses one more than good stock. Wiltshire stock, however, is not by any means all bad stock. There is much that is excellent in the physical state of the Wiltshire parent. I think I have already made it clear that the scale of wage in the county is very low. Moreover, I think I have made it apparent that so low is the scale of wages that many of the families are living in a state of primary and secondary poverty. Yet many of those families would cause no blush for their nutrition on the face of an employer who deemed it expedient to raise their wages on account of their conditions. I remember asking a woman who had six young children how she managed to have them in such a praise-worthy state of nutritional development on the

small wage which her husband earned. (It was 12/6 a week out of which 1/6 had to be paid for a cottage.) She told me that in the winter time, when she could not work, she incurred debts which she was able to pay off by her earnings in the summer time when she could work. Had she been a weakling, the debt would not have been paid and the credit would not have been forthcoming. Had her husband been a weakling they would probably have drifted into one of the communities I have already mentioned, swelling the ranks of the unemployed and physically unfit, or have been in receipt of poor law relief. Because they were both strong and healthy, they were able to exist without help and to rear a large family, which would have done credit to very much higher wage and improved conditions. Moreover, the tradesmen being aware of the utter absence of physical infirmity, were quite willing to give the very necessary credit, as the chances that the money would be forthcoming were apparently good, as far as fitness to earn it was concerned. Rosy cheeked, plump and in every sense fit children, the offspring of parents living under the pinched conditions of wages and environment, I have described in earlier pages of this paper, abound in Wiltshire. Can one wonder at this when one looks at the sturdy agricultural labourer of those downlands and vales, and notes also that his wife is not less robust? One also remembers that these people are the direct descendants of those who fought with King Alfred the Saxon, and that they have contributed largely to the pillars which support the temple of fitness of the whole Anglo-Saxon race.

TABLES TO COME IN HERE.

AVERAGE WEIGHT IN POUNDS.

R U R A L.

B O Y S.

t.	Ages.									
	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14.
	38.6	41.4	44.3	48.7	52.5	59.0	64.8	68.2	72.9	74.3
Avon.	34.6	40.5	41.9	47.7	52.1	56.6	61.1	69.0	71.1	78.0
	37.8	40.1	44.0	48.0	50.9	55.9	62.5	66.2	72.3	75.1
	36.1	40.4	43.5	48.5	51.1	57.2	60.1	67.5	71.7	77.8
W.B.	36.1	40.1	44.6	46.1	53.5	57.1	63.2	67.1	75.1	81.5
	37.3	40.1	43.1	46.1	53.8	56.4	60.9	68.1	73.6	78.3
	37.4	40.5	44.6	47.1	51.1	56.5	61.1	65.6	73.7	78.1
	37.2	41.6	42.5	49.3	52.6	56.3	62.6	70.6	75.0	81.5
.	37.1	40.2	44.3	47.1	54.5	59.4	63.1	67.2	76.3	82.1
	35.0	38.1	42.5	49.1	53.5	58.0	59.4	67.4	73.1	77.6
	35.1	41.6	45.5	48.7	50.9	58.1	64.0	67.1	76.1	76.1
	37.3	40.7	43.4	47.1	51.5	56.8	63.5	68.1	72.1	83.0
	37.2	39.0	42.7	47.7	53.0	56.0	62.3	67.0	71.4	76.0
	38.0	38.5	44.1	47.9	51.9	58.1	63.1	69.9	74.1	75.0
	37.7	40.4	44.1	49.5	54.0	56.2	64.2	67.8	73.1	79.8
	36.8	40.7	43.1	50.9	54.1	60.3	64.5	68.0	76.8	80.1
	36.4	38.5	44.6	49.1	51.0	56.5	60.1	66.3	69.5	72.6
	36.7	41.8	44.1	48.3	53.9	57.9	62.1	67.1	73.6	80.1
t.	Ames.	Wilt.	Mere.	Warm.	Marl.	Warm.	Ames.	Malm.	Warm.	Pews.
t.	Brad.	West.	Brad.	Crick.	Mere.	Calne.	Melk.	High.	West.	West.

AVERAGE WEIGHT IN POUNDS.

RURAL.

GIRLS.

ct.	Ages.									
	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
	37.9	39.5	41.1	47.9	53.4	55.1	63.7	71.0	79.5	85.8
n-Avon.	34.1	38.1	41.2	46.6	50.2	53.1	60.6	64.1	77.1	87.3
	36.1	38.1	43.1	47.0	52.1	55.1	63.8	68.6	75.1	84.3
.	35.9	39.3	44.3	46.1	50.5	55.5	59.3	65.6	75.0	80.1
& W.B.	36.5	39.7	42.9	48.0	50.5	55.9	61.8	69.3	75.9	84.1
	37.5	39.2	42.1	46.1	50.9	54.3	63.0	69.5	74.5	83.1
	35.7	39.5	43.6	47.1	50.1	55.0	61.9	68.7	74.1	83.1
y.	36.6	39.4	44.3	46.5	53.3	59.0	61.3	68.5	76.2	83.0
gh.	36.3	38.5	42.1	47.1	51.6	57.6	61.1	66.1	78.1	87.6
	37.1	37.2	40.1	45.3	49.1	56.2	59.0	65.1	72.9	86.1
	36.0	40.0	44.0	48.1	51.3	57.0	60.9	68.1	77.5	3.0
	35.3	38.0	41.3	45.8	49.4	56.2	59.9	65.1	74.0	4.5
	~~37.0~~	~~39.7~~	~~42.1~~	~~46.1~~	~~51.1~~	~~55.1~~	~~61.1~~	~~67.9~~	~~76.8~~	~~85.0~~
.	37.0	39.7	42.1	46.1	51.1	55.1	61.1	67.9	76.8	85.0
	36.5	42.3	42.4	47.7	49.1	55.7	60.5	66.9	80.6	84.1
r.	37.0	42.4	43.4	48.9	53.8	58.7	61.1	67.1	77.1	86.1
	35.1	39.0	41.1	46.1	50.1	56.5	61.6	68.3	76.1	81.7
	36.2	40.4	41.0	47.0	50.9	56.2	60.1	69.1	73.1	85.9
est.	Ames.	Warm.	Chipp.	Warm.	Warm.	Warm.	Calne.	Ames.	Tisb.	Marl.
est.	Rams.	Melk.	Rams..	Melk.	Tisb.	Brad.	Rams..	Brad.	Melk.	Chip.

The Ramsbury figures are not available.

AVERAGE WEIGHT IN POUNDS.

U R B A N.

B O Y S.

Ages.

	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
Avon.	36.2	41.1	43.7	48.2	50.1	57.1	62.0	64.7	71.9	78.1
	36.7	39.1	43.0	47.7	52.1	54.9	61.1	67.1	75.3	77.9
	37.1	38.1	43.0	47.1	50.2	58.3	59.3	64.6	71.7	79.4
	36.8	40.0	42.0	46.3	50.8	54.8	59.2	65.5	71.6	76.8
	35.6	38.9	44.1	49.2	50.9	56.4	63.0	63.9	72.6	81.7
	36.1	40.6	45.5	49.5	52.1	57.0	59.7	67.7	75.1	81.5
	36.6	40.2	44.5	47.1	50.1	55.6	59.5	68.0	71.1	79.1
	35.7	39.3	42.0	48.0	50.1	57.1	59.1	65.1	71.9	78.3
	36.0	38.7	43.0	47.2	51.6	55.9	61.0	65.2	75.7	80.4
	35.6	40.6	43.5	47.0	53.7	56.6	63.4	69.4	75.3	85.0
	38.1	41.6	47.7	47.1	52.0	58.2	62.7	70.6	73.8	78.3
t.	Wilt.	Wilt.	Wilt.	Marl.	West.	Wilt.	West.	Wilt.	Marm.	West.
.	West.	Chip.	Dev.	Dev.	Brad.	Dev.	Trow.	Malm.	Melk.	Dev.

The Wilton Urban area is very small. The number of children examined few.

AVERAGE WEIGHT IN POUNDS.

U R B A N.

G I R L S.

Ages.

	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
Avon.	36.4	38.1	42.1	46.0	51.3	54.4	59.5	65.1	75.0	85.5
	35.9	38.1	41.6	46.4	49.8	54.0	61.3	66.9	75.6	87.4
	34.7	38.3	43.3	45.4	49.4	55.1	60.8	70.1	73.3	86.1
	35.7	38.4	40.7	45.9	51.2	53.2	60.1	67.2	72.5	82.9
	34.1	39.1	44.1	46.3	52.4	56.7	60.1	66.2	77.0	83.5
	36.1	38.8	44.1	45.8	54.1	56.7	65.7	66.2	77.0	92.1
	36.1	40.3	43.1	44.2	50.0	54.9	59.8	66.8	72.1	79.5
	34.3	38.1	41.5	47.1	52.9	54.1	59.0	64.1	71.0	80.1
	36.6	38.5	42.1	46.8	50.7	54.1	62.1	64.8	74.0	81.6
	36.2	38.7	42.0	44.4	49.6	53.4	59.5	64.7	71.2	76.7
	36.3	40.1	42.6	48.0	55.3	57.8	58.6	66.9	79.9	90.7
Highest.	Warm.	Melk.	Marl.	Wilt.	Wilt.	Marl.	Marl.	Chip.	Wilt.	Marl.
Lowest.	Malm.	Trow.	Dev.	Melk.	Chip.	Wilt.	Wilt.	Trow.	Trow.	West.

The Wilton Urban area is small. The number of children examined few.

AVERAGE HEIGHTS IN INCHES.

RURAL.

BOYS.

Ages.

	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
	39.7	41.6	43.7	45.8	47.2	49.8	51.6	53.2	54.6	56.7
on.	39.5	42.5	42.6	46.0	48.4	49.0	51.1	53.9	55.1	57.3
	38.1	41.5	43.9	45.5	47.0	49.5	51.3	53.4	54.9	56.6
	38.0	41.4	43.4	45.3	47.6	50.5	51.5	53.9	54.5	56.8
B.	35.3	41.1	43.6	45.0	47.8	48.5	51.4	53.3	55.1	56.6
	39.0	42.5	43.6	44.1	47.5	49.6	49.9	53.4	55.2	56.3
	39.4	41.2	43.6	46.2	47.7	50.9	51.5	52.5	55.1	57.3
	38.8	41.5	42.8	45.5	47.8	48.5	51.2	53.1	55.3	56.4
	39.3	41.6	43.8	45.1	48.0	49.9	51.8	53.1	55.3	56.4
	38.3	41.1	43.1	46.2	49.1	50.0	51.2	53.7	55.1	56.7
	37.4	42.5	43.7	45.8	47.1	50.2	51.5	53.1	55.9	56.2
	39.1	41.6	42.5	45.6	48.5	49.9	52.0	54.1	54.8	58.0
	38.6	40.6	43.2	45.7	47.5	49.1	51.0	52.7	54.2	55.0
	39.0	41.8	43.8	45.5	47.1	49.7	51.1	53.3	55.0	56.4
	39.4	41.7	43.7	46.3	48.2	49.4	51.9	53.4	54.7	57.4
	38.8	41.8	43.6	46.6	48.3	50.2	52.4	53.5	55.5	57.4
	39.0	40.1	43.7	46.2	47.3	48.7	49.9	53.5	54.3	55.0
	39.1	41.5	45.0	45.9	48.1	49.6	51.4	53.5	54.7	57.5
	Ames.	Mere.	Wilt.	Warm.	Melk.	High.	Tisb.	Pews.	Mere.	Pews.
	Crick.	West.	Pews.	Dev.	Calne.	Malm.	West.	High.	Rams.	West.

AVERAGE HEIGHTS IN INCHES.

R U R A L.

G I R L S.

Ages.

	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
	39.4	41.1	42.6	46.5	48.3	49.0	52.6	55.5	55.7	56.6
Avon.	39.0	42.2	42.7	45.3	47.7	49.4	51.9	53.7	57.4	58.7
	39.8	41.4	43.0	45.0	48.8	49.3	52.0	53.5	55.8	57.8
	38.5	41.4	43.4	45.7	47.7	49.8	52.1	53.3	55.3	59.2
W.B.	38.2	41.0	43.0	45.5	47.2	49.0	51.4	54.2	55.4	58.2
	39.1	40.8	43.0	45.1	47.5	49.3	50.9	54.8	55.7	57.9
	38.4	40.8	43.0	45.5	47.0	48.8	51.7	53.8	55.6	58.0
	39.0	41.2	43.1	44.6	46.6	49.5	51.0	53.7	55.4	57.8
	39.1	40.0	43.4	45.8	47.5	49.4	51.3	53.4	56.4	58.6
	39.4	40.2	43.2	45.4	48.0	49.7	51.4	53.4	55.7	59.0
	39.3	41.9	42.8	45.9	47.1	49.8	50.1	53.8	56.1	57.6
	39.6	40.0	42.9	45.3	47.7	48.7	51.4	53.3	56.3	58.3
	38.2	41.2	43.0	45.0	47.6	49.3	51.0	54.0	56.5	58.4
	39.3	41.5	43.2	45.5	47.5	49.2	50.3	54.1	55.4	58.7
	39.0	41.1	43.6	45.7	47.1	49.1	51.1	53.1	56.7	57.5
	39.1	41.5	43.9	46.6	48.6	49.4	52.0	53.8	56.9	59.0
	38.8	41.8	42.7	45.1	47.6	49.6	51.6	53.1	55.9	57.5
	38.7	41.4	42.5	45.8	47.6	49.3	51.1	54.1	56.0	58.1
	Calne.	Brad.	Warm.	Warm.	Calne.	Mere.	Ames.	Dev.	Warm.	Chipp.
	Rams.	Pews.	Wilt.	Malm.	High.	Pews.	Mere.	Tisb.	Chipp.	Ames.

AVERAGE HEIGHTS IN INCHES.

U R BA N.

B O Y S.

Ages.

	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
von.	38.8	42.0	43.5	45.5	47.3	49.7	50.4	52.3	54.5	56.8
	39.0	41.2	44.0	456	48.1	49.5	51.2	54.0	56.0	56.6
	39.1	40.7	43.1	45.1	47.0	48.4	49.7	51.4	54.1	56.0
	38.4	41.7	42.1	45.0	46.4	48.7	50.3	52.8	54.5	56.9
	38.2	40.8	43.1	45.8	47.1	47.8	50.8	50.3	55.1	56.7
	39.2	41.6	43.1	45.0	47.6	50.0	51.6	53.4	55.9	56.8
	39.0	41.5	43.3	45.6	47.6	48.0	50.0	54.3	54.7	57.0
	36.7	41.3	42.6	45.5	47.7	49.4	50.6	50.6	54.6	56.7
	40.3	41.5	43.4	46.0	48.3	49.6	50.7	52.7	54.9	57.0
	38.7	41.4	43.1	45.5	48.8	49.5	52.1	----	56.0	57.0
	40.0	41.1	45.8	45.3	48.0	49.3	52.0	54.4	55.1	56.1
t.	Warm.	Brad.	Wilt.	Warm..	West.	Marl.	West.	Wilt.	Calne & West.	West.
	Trow.	Chipp.	Dev.	Marl.	Dev.	Malm.	Chipp.	Malm.	Chipp.	Chipp.

AVERAGE HEIGHTS IN INCHES.

U R B A N.

G I R L S.

Ages.

	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
Avon.	38.8	40.9	43.0	43.3	47.7	48.5	50.8	53.5	55.8	55.9
	38.6	41.0	42.7	45.7	47.5	48.9	51.4	52.9	55.7	58.9
	38.1	40.4	43.6	44.8	46.5	49.4	51.2	54.5	55.6	58.1
	38.7	40.9	43.7	45.1	48.0	49.1	51.8	53.9	55.4	57.9
	37.8	41.0	42.3	44.6	46.8	48.1	50.6	53.4	55.4	55.1
	37.7	40.7	43.6	45.2	47.7	50.0	52.6	53.2	55.4	58.8
	38.5	41.6	43.3	45,1	47.1	49.0	51.0	52.8	55.3	56.5
	38.1	40.1	42.7	45.5	47.2	50.5	51.5	53.0	55.7	58.4
	39.5	42.3	44.2	46.7	47.3	51.5	51.6	53.0	55.6	57.2
	39.0	40.8	44.1	45.2	47.6	49.3	51.2	53.1	55.1	56.0
	38.5	41.7	44.5	46.1	48.6	48.8	51.2	54.0	57.3	59.6
	Warm.	Warm.	Wilt.	Warm.	Wilt.	Warm.	Marl.	Chipp.	Wilt.	Wilt.
	Marl.	Trow.	Malm.	Brad.	Chipp.	Malm.	Malm.	Melk.	West.	Malm.

BRITISH ANTHROPOMETRICAL FIGURES. 1883.

HEIGHTS IN INCHES.

Boys.	Girls.
39.3	39.0
42.3	41.9
44.6	43.4
45.8	45.3
47.1	47.1
49.1	48.9
50.9	50.4
52.7	52.5
53.7	55.6
55.3	57.4

WEIGHTS IN POUNDS.

Ages.	Boys.	Girls.
4-5	35.8	34.6
5-6	38.9	38.4
6-7	44.2	40.5
7-8	47.2	46.8
8-9	54.6	51.9
9-10	60.5	56.5
10-11	67.0	61.8
11-12	72.2	67.1
12-13	75.9	75.5
13-14	79.7	84.0

I now pass on to the discussion of the tables of height and weight. I have already explained that these tables deal with large numbers of children. The heights have been taken without boots, but the clothing in all cases has been otherwise undisturbed. I am perfectly aware that different amounts of clothing must give rise to disparity in results. This would be the case were we comparing individual children. But we are not. We are comparing masses of children who are living under different conditions of wages, housing, and geological surroundings.

I have given the tables for the urban districts as well as the rural, but I do not want tham to enter much into the interpretation. They serve to show clearly what I have already stated; i.e. that rural figures are better than urban figures, clearly pointing to the fact that some conditions obtained in the towns which puts them at a disadvantage with the rural districts. I have already stated that the housing of the Wiltshire towns is as good as much of the rural housing, (in many cases it is better). The Wiltshire towns are not highly urbanised industrial centres in which great conditions of over-crowding and lack of air space; etc. obtain. The average scale of wages in the towns is higher than in the rural districts. Yet in spite of these conditions the average height and weight of the children is on the whole less satisfactory than in the rural districts, I have already mentioned that into most of these towns there congregate the physically unfit,-- the labourer from the farms who has lost his work on account of life,-- the casual man who has never had a constant employment,-- the physical weakling who cannot do any work but the lightest of labour. Moreover, in the towns the number of people in receipt of poor law relief is always greater than in the

country.

I have already said that perhaps the worst conditions exist in the Pewsey rural district. Wages are as a rule very poor. (I have mentioned the fact already that in one community in which I investigated the economics of the people, the scale of wage was actually 12/6 a week without a cottage. This village was in the Pewsey area.) The housing is bad, being mostly situated in the valleys, where dampness abounds, and is often in the state of the utmost disrepair. The percentage of thatched cottages here is very high.

Now considering those bad conditions of environment, it will be interesting to notice that amongst the ten age groups of height and weight figures, Pewsey does not figure once as the lowest in weight in either boys or girls. As it figures four times in height as the lowest, it makes the problem very interesting. Ounces per inch is often taken to represent nutrition. We have in Pewsey a relatively high ratio of ounces to inches since Pewsey figures not once in the lowest average weight figures, but four times in the lowest average height figures. The nutrition then of Pewsey in which all the bad conditions of environment I have mentioned prevail is nutritionally relatively good.

Again the Pewsey area figures once amongst the height and weight figures and twice amongst the highest height figures. At the age of 13-14 Pewsey boys are the highest and heaviest in the county. This, at the age when the effects of prolonged bad environment would be expected to be very apparent, does not support a theory that defective nutrition is the result of bad surroundings.

Peculiarly enough, the areas which figure most in the

rural lowest weights are Bradford, Ramsbury, Melksham and Westbury. In these areas the conditions are by no means as bad as in the Pewsey area. Some of the Westbury area may be pretty poor as regards wages, but the environment is better, for much of the housing is on the downland part of the county. In Ramsbury and Melksham the wage scale is distinctly better, and in the Melksham and Bradford areas the housing is most decidedly better than in the Pewsey area.

Perhaps the most striking thing about the weight figures is the number of times that Warminster rural area comes out on top. Now the conditions of environment in Warminster are by no means favourable, and the wage scale is not by any means a relatively lavish one. It will be observed that not only in weight but in height the Warminster figures prominently in the highest figures. A considerable proportion of the housing in the Warminster area is on the uplands, but the area includes a large number of villages in the valleys in which the housing is by no means good. I cited the Warminster rural area as being next worst to the Pewsey area sociologically. There is a high percentage of small houses.

When giving the census returns regarding the house accommodation distribution in an earlier part of this paper, I mentioned the Malmesbury area as being much more favourable in regard to the wage scale and environment than either of the two areas of Pewsey and Warminster. It will be observed that Malmesbury figures only once amongst the highest weights and does not figure at all amongst the lowest weights. It figures twice amongst the lowest heights. We have therefore in Malmesbury, an area which is sociologically decidedly above the average rural area of Wiltshire, no excess of weight or height over any of the other areas. In fact, comparing it with the Pewsey area we

find that in the ten boy age groups, Pewsey is higher in six and Malmesbury is higher in four. In the girls however, Malmesbury is heavier in nine age groups, and Pewsey only in one. Marlborough is altogether a different area to Malmesbury. The former is almost entirely on the downland of chalk, whilst the latter has not a single home on the downland, the soil in the Malmesbury case being entirely rich loam. There is no great disparity in the height and weight figures between these areas. In height the figures are very uniform, and in weight each area comes out on top pretty equally. The accomodation per household would seem to be fairly uniform in the two areas. As regards wage scale Malmesbury is on the whole better than Marlborough, although in the latter area several parishes are relatively high.

In the Salisbury area, where wages are relatively good and where much of the housing is in the pine-wood district, although a considerable portion is on the chalky downland, and where the housing is better and the distribution of persons per tenement is altogether better than in the Pewsey area, we find that the height and weight figures do not appear in either the highest or lowest weight columns in a single instance. The same applies to the height columns.

In the Chippenham area good progress has been made recently in providing better houses for the labouring classes. What has been the effect on the nutrition of the children? A reference to the tables will elicit the information that Chippenham weights appear once in the highest column and once in the lowest column. This area also appears only once in the highest height column and once in the lowest height column.

I have already mentioned that in the Highworth area

the scale of wages can be taken as being the best in the county. Many of the men work in the Great Western Railway factory at Swindon, where the wages are altogether higher than those of the agricultural labourer of rural Wiltshire. The housing is also on the whole more modern than that of the other rural areas, and the distribution of the population per household compares very favourably with the Pewsey area; for instance, Highworth does not figure once in the highest weight column. It appears once in the highest height column and twice in the lowest height columns. No great effect of the differences of environment between the Highworth area and the Pewsey area is, therefore, apparent. I have already mentioned, however, that the Highworth population must not be taken as typically Wiltshire rural people. Much of it is, but there has been considerable importation of "outside blood" as the Great Western Railway Employees come from all parts of the country.

In the tables of height and weight, it will be observed that occasionally results have been arrived at which suggest error. Thus, for instance, in the Melksham rural area the average weight of girls aged 4-5 would appear to be almost identical with the average weight of girls 5-6. I have already said that error has been eliminated as far as possible, but in a few instances, from lack of numbers, and such causes, results have been obtained which are not altogether dependable. A few of the rural areas have small school populations at certain ages.

I now pass on to the cases which I have collected. I have stated that I have been scrupulously fair in the collection of these and have mentioned what method I followed. Let it be understood that these cases were consecutive and that the information obtained was reliable, and that no selecting action was employed save that which brought each individual case under

one of the two classes; i.e. (1) The class in which the parents' wages did not exceed 14/- a week; (2) Cases of malnutrition.

I give the cases which come under the former first.

(1) Girl aged 12 yrs. 3 mths., weight 102 lbs., height 5 ft. 2 inc.; one of five children. Father and mother are big people of excellent nutrition. The father's wage is only 11/- a week. This girl's nutrition is excellent.

(2) Girl aged 4yrs. 5 mths., weight 34 lbs., height 3 ft. 2 inc. She is a healthy well-built child, is very verminous. She is of healthy parentage. The father earns 12/- a week.

(3) Boy aged 4yrs. 5 mths., weight 46 lbs. 6 ounces., height 3 ft. 4 inc. This is a fine lad. He is one of a family of nine, of whom eight are living. Several of the other children are thin but healthy. The father and mother are strong and of good nutrition. The father's wage ~~are~~ 14/- a week.

(4) Girl aged 13. Weight 104 lbs., height 5 Ft. 1¾ inc. She is the second of a family of 12. Her height and weight show her to be a girl of good proportions. Five sleep in her room at home. Both father and mother are healthy and of good nutrition. The father's wages are 13/- a week. The home is so dirty, and there has been such overcrowding, that officers of the National Society for the Prevention of Cruelty to Children have been in attendance.

(5) Boy aged 5 yrs. 8 mths., weight 41 lbs., height 3 ft. 4 inc. A fairly developed child with a tendency to adenoids. He is poorly clad. He is one of a family of fifteen. The father's wages are 13/- a week. The mother is strong. The father is a rheumatic subject.

(6) Boy aged 4 yrs. 1 mth., weight 34½lbs., height 3 ft.

3¾ inc. He is one of a family of six, the oldest being 9. He is quite a well-developed lad. His father and mother are healthy people. The father's stock is particularly good. Two members of the mother's family are the subjects of spinal curvature. (see next case.)

(7) Boy aged 6½yrs., weight 39 lbs., 4 ounces; height 3 ft. 8 inc. Is a rather poor lad and is a brother of the former case. He has had infantile paralysis with a development of talipes Valgus. An uncle of the above two children attends the same school and he is a dwarf. At 13 years of age he is 4 ft. ¼ inc. in height and weighs 37 lbs. 8 ounces.

(8) Boy aged 4 yrs. 7 mths., weight 36 lbs., height 3 ft. 3 inc. This is a strong healthy lad. The father is a shepherd earning 13/- a week. The father is small, but both he and the mother are active and healthy. The home is very poor. A brother is totally blind from ophthalmia neonatorum, but is a splendid specimen of a boy.

(9) Boy aged 6 yrs. 1 mth., weight 44 lbs., height 5 ft. 6 inc. This is a fine specimen of a boy. He is come of a notably healthy, active and well-nourished stock. He comes daily about 2½ miles to school.

(10) Girl aged 5 yrs. 8 mths., weight 47 lbs., height 3 ft. 6½ inc. A fine strong child, brought up on a wage of 11/- a week. The mother and father are people of great physical vigour.

(11) Girl aged 13 yrs. 8 mts., weight 69 lbs., height 4 ft. 6¾ inc. She is not a very robust girl. Her nutrition is defective and she looks delicate. The mother is rather a poor creature and the father is subject to rheumatism. She is one of a family of eight (one dead). The other members of the family are anaemic.

(13) Girl aged 4 yrs. 4 mths., weight 35 lbs. 12 ounces, height 3 ft. ¾ inc. She is quite a fine child. Is very healthy and has excellent teeth. The father and mother are very strong and healthy people. Intelligence is much lacking in both parents and children. Wages 12/- a week.

(14) Boy aged 6 yrs., weight 45 lbs., height 3 ft. 7 inc., He is a healthy and sturdily built little fellow. He is sadly neglected being in rags and very dirty. His father is a small holder but is very poor, being unable to pay the £18 a year rent. He is strong. The mother is a big strong brawny woman, capable of a man's work. It is computed that the actual profits in this case must be well under 14/- a week.

(15) Girl aged 13 yrs. 4 mths., weight 74 lbs., 12 ounces., height 4 ft. 6¾ inc., She is a plump well-nourished child, of a very healthy parentage. She is a picture of good nourishment.

(16) Girl aged 8 yrs. 7 mths., weight 43 lbs. 8 ounces., height 3 ft. 9½ inc. This is a delicate child, is poorly nourished and has an unhealthy com lexion. The mother is a consumptive, and recently has undergone an operation for the removal of a tumour.

(17) Boy aged 11 yrs. 1 mth., weight 56 lbs. 8 ounces., height 4 ft. 1¾ inc. Is a delicate boy with pale complexion and sunken eyes; is a brother of the former case.

(18) Girl aged 4 yrs. 8 mths., weight 35 lbs. 8 ounces, height 3 ft. 3 inc. She is a healthy, bonny child. Is one of a family of 6, eldest 13 yrs. The mother, a healthy woman, died in confinement. The father a robust man, earns 13/- a week.

(19) Girl aged 13 yrs. 8 mths., weight 83 lbs. 8 ounces,

height 4 ft. 7¾ inc. Strong girl of excellent nutrition. Father and mother small in stature but of robust nutrition. There has been a healthy family of six in fourteen years. Wages are 13/- a week.

(20) Girl aged 10 yrs. 8 mths., weight 57 lbs. 8 ounces, height 4 ft. ¾ inc. This is a sister of the last case. She is of quite normal nutrition and is healthy. Her speech is defective. The father also has a defect in his speech.

(21) Girl aged 13 yrs, weight 66½ lbs., height 4 ft. 5¼ inc. She is a small girl but looks healthy and is of normal nutrition. Both parents are healthy. The mother is tall; the father is medium in height. The wages are 12/- a week.

(22) Girl aged 5 yrs. 2 mths., weight 40 lbs., height 3 ft. 5½ inc. This child looks quite delicate. She ~~It~~ has asthma and ~~it~~ is pale and undernourished. The father is a strong healthy labourer getting 12/- a week. The mother is continually in the doctor's hand and is of poor nutrition.

(23) Boy aged 5 yrs. 8 mths., weight 38 lbs., height 3 ft. 2 inc. He is pale and pasty, and is subject to chest affections. A little sister is in the same state. The mother is obviously a delicate woman of poor nutrition. The husband is strong and earns 12/- a week.

(24) Girl aged 5 yrs., weight 42 lbs., height 3 ft. 4 inc. This child is thin. She is subject to bronchial attacks and nearly died recently of acute bronchitis. The mother is a tall thin woman of poor nutrition and indifferent health. The father is strong and earns 12/- a week wages out of which 3/6 goes for rent.

(25) Boy aged 5 yrs. 11mths., weight 47 lbs., height 3 ft.

6½ inc., This is a strong healthy lad, come of a strong healthy parentage. There is one other healthy child. Wages are 12/- a week and rent 1/- a week.

(27) Boy aged 5 yrs. 10 mths., weight 42½ lbs., height 3ft. 3½ inc. This is a boy of excellent physique and nutrition. His sister is equally well developed. His parents are small in stature but are exceedingly healthy. Wages 12/- a week.

(28) Girl aged 12 yrs. 11 mths., weight 67 lbs., height 4 ft. 7 ounces. This girl although thin is very healthy. The mother is a big stout healthy woman. The father's stock is very spare. Of the four children, two take after the father and two after the mother. Wages are 12/- a week.

(29) Boy aged 12 yrs. 9 mths., weight 82 lbs., height 4 ft. 8½ inc. This is a strong healthy boy, come of a strong healthy stock. Wages of father 14/- a week.

(30) Boy aged 12 yrs. 9 mths., weight 77 lbs., height 4 ft. 2¼ inc. A somewhat delicate boy whose nutrition is by no means good. His chest is underdeveloped. The parents are strong and healthy and of good nutrition; ~~but~~ both drink. This case may be a sport.

(31) Girl aged 3 yrs. 2 mths., weight 30 lbs., height 2 ft. 11 inc. This is a strong healthy child. She is robust and well-nourished. She is one of a family of seven. The oldest is 10 years old. Her father and mother are both strong and healthy, and of excellent nutrition. The father drinks to excess and earns a wage of 13/- a week.

(32) Girl aged 3 yrs. 3 mths., weight 32 lbs., height 2 ft. 10 ¼ inc. Fairly well-nourished, but pasty in complexion. The other children are diminutive. The father is robust but the mother is weakly . Wages are 13/- a week.

(33) Girl aged 4 yrs., height and weight not obtained, but is a strong, healthy sturdy child, and in every way physically fit. Both parents are very healthy. There is a big family and at present there are ten people sleeping in two bedrooms; one small. The wages are 14/- a week.

(34) Boy aged 5 yrs. 5 mths., Height and weight not obtained, but is a big strong healthy lad of excellent nutrition. He is very dirty and is covered with the rash of scabies. His personal appearance is one of thorough neglect. The father and mother are strong healthy well-nourished people, but very ignorant. There is a family of four, all well-nourished, and the father earns 13/- a week.

(35) Boy aged 5 yrs. 6 mths., weight 42 lbs 8 ounces, height 3 ft. 7½ inc. He is tall for his age and is well-nourished. The mother is healthy but father has spinal curvature. The wages are 12/- a week and the cottage is very bad.

(36) Girl aged 5 yrs. Weight 36 lbs. 8 ounces., height not obtained. One of a family of eight of whom seven are healthy. One girl at the age of [illegible] is weakly and of poor nutrition. The parental stock is very good, and this child's nutrition is normal. The father's wage is 12/- a week. The rent is 1/6.

(37) Girl aged 5 yrs. 4 mths., weight 33½ lbs., height 3 ft. 3 inc. This child is rather thin, and I understand that the family cupboard is frequently empty. The mother is healthy although she looks worn.

(38) Boy aged 3 yrs. Height and Weight not obtained. Is a chubby, well-nourished boy, one of four, brought up by very healthy parents, on a weekly wage of 14/-.

(39) Boy aged 12 yrs. 5 mths., weight 72 lbs., height 4 ft. 4¾ inc. This boy's nutrition is quite normal. He is one of a family of three, who with father and mother sleep in one bedroom. The father's wage is 12/6 a week. The stock is good.

(40) Boy aged 7 yrs. Height and Weight not obtained. Very dirty. One of a family of three; come of a healthy stock. Wage 12/- a week.

(41) Boy aged 3½ yrs. Weight 29 lbs., height 3 ft. 2 inc. Quite normal in nutrition. Is one of a family of twelve; brought up by healthy parents on 12/- a week.

(42) Girl aged 5 yrs. 5 mths. Weight 35 lbs. A healthy child; is normal nutrition. One of family of two. Stock normal. Wages 12/- a week.

(43) Girl aged 5 yrs. 8 mths. Weight 34 lbs. Height 3 ft. 4 inc. A small thin child, but nutrition not defective. Mother healthy but is small and thin. Father is healthy. Wages are 12/- a week.

(44) Girl aged 4 yrs. 11 mths. Weight 34½ lbs. Height 3 ft. 2 inc. Excellent nutrition; excellent stock. Wages 12/- a week.

(45) Girl aged 4 yrs. 11 mths. Weight 39 lbs. Height 3ft. 3 inc. A child of good nutrition; come of hardy parents. The father' s wage is 12/- a week.

(46) Boy aged 4 yrs. 1 mth. Weight 32 lbs. Height 2 ft. 10 inc. Is a fat well-built, well-nourished boy. The stock is one of good nutrition; wages are 12/- a week.

(47) Boy aged 12 yrs. 10 mths. Weight 60 lbs. Height

4 ft. 2 inc. Is a small spare boy. Appears healthy in nutrition. Comes of a stock of small spare people.

(48) Boy aged 4 yrs. 2 mths. Weight 28 lbs. Height 3 ft. 1½ inc. Is of normal nutrition. One of a family with normal nutrition, except one brother included in the cases of malnutrition. Father has chronic bronchitis. The mother is strong and healthy.

(49) Girl aged 13 yrs. Weight 98 lbs. 3 ounces. Height 4 ft. 10¾ inc. Nutrition good. Is a sister of last case.

I will next give cases of defective nutrition seen consecutively by me.

(1) Girl aged 11 yrs. 7 mths. Weight 52 lbs. 6 ounces. Height 3 ft. 11½ inc. Is of poor nutrition and very pinched and is very neglected. Had an epileptic fit in school the other day. (Family history see next case.)

(2) Boy aged 8 yrs. 5 mths. Weight 45 lbs. Height 3 ft. 7½ inc. A brother of the last case. Is pinched and neglected. The mother of these children is a frail incapable creature. The father is thin. His wages are 15/- a week. There is a family of five.

(3) Boy aged 8 yrs. 10 mths. Weight 57 lbs. 6 ounces. Height 3 ft 9 inc. Looks pinched and is certainly malnourished. Several other members of the family are average. The mother is stout plethoric woman. The father's wages are 14/-a week, and he also has a pension from the army. The home is excellent. The mother is incapable.

(4) Girl aged 5 yrs. 8 mths. Weight 37 lbs. Height 3 ft. 4½ inc. A very thin pale and delicate looking child. One of four children. The mother informs me that there is

tuberculosis in the family. The father is a tall thin man but very healthy. The child squints; so does mother;

(5) Boy aged 6 yrs 2 mths. Height and Weight not obtained. A thin, poorly nourished lad. Has a tubercular brother. The mother is of a markedly tubercular stock. The father is healthy and earns good wages.

(6) Girl aged 9 yrs. 3 mths. Weight 24 lbs. 4 ounces. Height 3 ft. 4½ inc. One of a family of sixteen. She is quite undeveloped and has marked rachitic symptoms. A little brother has also rachitic symptoms. The father and mother are of excellent stock. The mother is still under 40, so that the children have come rapidly the one after the other. The father's wages are 15/- a week.

(7) Girl aged 5 yrs. Weight 30½ lbs. Height 3 ft. 3½ inc. She is a poor little fragile child. A brother and sister are of defective nutrition, but are improving. The father and mother are strong healthy people, and the home and circumstances are excellent. The mother is known to resort to the use of ecbolics.

(8) Girl aged 5 yrs. 2 mths. Weight 28 lbs. Height 2ft. 11¼ inc. A very poorly nourished diminutive child. One of a family of five, born in rapid succession. The father and the mother are of somewhat delicate constitution, and both are members of large families.

(9) Boy aged 6 yrs. 11 mths. Weight 48 lbs. Height 3 ft. 11¾ inc. This is a thin lad, with a poorly developed chest. The mother is a tiny incapable sort of a woman. Father never retains work on account of incapability; but he has earned good wages. The family have by no means, however, suffered privation.

(10) Girl aged 6 yrs. 9 mths. Weight 48 lbs. Height 3 ft. 10¼ inc. She is a very thin fragile child. Her complexion is delicate. She was born prematurely; (7th mth). The family history is excellent and the home is very good.

(11) Bot aged 6 yrs. 2 mths. Weight 36 lbs. Height 3 ft. 4 inc. A poorly developed child; born in late life. Environment in every way favourable; parents healthy, but married late and had only this child.

(16) Girl aged 6 yrs. Weight and Height not obtained. Father keeps local post-office, and every care is bestowed on the child, who lives in a most favourable environment, and yet is of very defective nutrition. The mother is unhealthy.

(13) Girl aged 10 yrs. 9 mths. Weight 64½ lbs. Height 4 ft. 4¾ inc. Is one of a family of nine. Oldest 24 yrs. of age. Father and mother are tall people, but of poor nutrition. This child' nutrition is defective. There is 33/- weekly coming into the home.

(14) Girl aged 10 yrs. 11 mths. Weight 52½ lbs. Height 4 ft. 2 inc. She is white and pasty and under-developed. Father earns good wages. The mother is a slut, and is stated to be indifferent to her children. She and her husband are of good nutrition.

(15) Girl aged 5 yrs. 2 mths. Weight 35½ lbs. Height 3 ft. 3½ inc. She is pinched and delicate and of defective nutrition. She is stated to be subject to asthma, and at present she is suffering from it. Father is subject to chest troubles. Wages 12/-, but there is other money coming into the home.

(16) Girl aged 12 yrs. Weight 72½ lbs. Height

4 ft. 6½ inc. She is pale and pinched, and thin, and is vacant and lacking in intelligence. She is very verminous. The mother, of poor physique, goes out to work. One child has a cleft palate. All the other children are poorly nourished. Wages are 12/- a week.

(17) Boy aged 7 yrs. 8 mths. Weight 60 lbs. Height 4 ft. Is an anaemic lad with a poorly developed chest. Has been operated on for adenoids. His mother is a consumptive, and has been in a sanatorium. The only other child died of phthisis. Wages 15/- a week.

(18) Boy aged 10 yrs. 4 mths. Weight 72 lbs. Height 4 ft. 6 inc. This lad is under-developed physically and mentally. The parents are strong and well-developed people. The environment is good, wages being good and the children are well-cared for. A brother is also of defective nutrition . These cases are undoubted sports.

(19) Boy aged 12 yrs. weight 84 lbs. Height 4 ft. 11¼ inc. This is a tall thin lad of defective development. He has a tubercular mother and a brother died of phthisis. Father's wages are 15/-.

(20) Girl aged 8 yrs. 10 mths. Weight 56 lbs. Height 4 ft. 3½ inc. This is a smart intelligent child whose nutrition is decidedly defective. The mother is tall, thin and delicate. Environment is above the average. Is an only child.

(21) Boy aged 13 yrs. Height and Weight not obtained. Child of small build, narrow-chested and defective of nutrition. Is illegitimate. Mother is a cripple of poor nutrition, now married to a labourer earning 14/- a week.

(22) Two girls, sisters, are decidedly unhealthy in appearance

and nutrition. The envirdnment is good and the parents appear to be healthy. The family is big, all being of school age. The chief nutritional defect is extreme pallor.

(23) Girl,-- Tall and very narrow chested and defective in nutrition. Come of a very unhealhty stock in which teberculosis plays a prominent part. The environment is comparatively speaking excellent.

(24) Girl aged 6 yrs. An intelligent child, but of poor nutrition. She is small and pale and has sunken eyes. She is the youngest of 13 and the mother's stock is good. The father, however, is rather delicate. The family circumstances are good and the house excellent.

(25) Boy aged 5 yrs. 3 mths. Weight 42 lbs. Height 3 ft. $4\frac{3}{4}$ inc. A heavy boy but of decidedly defective nutrition. He is flabby and unhealthy in appearance and shape of head suggests rickets. The mother died of pneumonia. The father is a big strong healthy man earning good wages.

(26) Girl;--- poorly nourished, poorly clad child, aged 9. Is one of seven girls, oldest 12. The environment is not by any means bad. The mother is a delicate woman of poor nutrition. The father is a strong and healthy man, and earns 14/- a week.

(27) Girl;--- Tall, thin, delicate and of poor nutrition. Father earns good wages, and environment is favourable. Mother is very delicate.

(28) Girl;--- Defective in nutrition, with eczema. Mother is delicate and incapable. Father is a black-smith earning good money.

(29) Girl aged 11 yrs. Weight 73 lbs. Height 4 ft. 10 inc. A delicate looking girl of defective nutrition. A brother is deformed and is an epileptic. Mother is very thin but healthy, father is thin and has heart disease. The home is excellent and father's money is good.

(30) Boy aged 7 yrs. 7 mths. Weight 45 lbs. Height 4 ft. 1 inc. This boy is very delicate and is badly nourished. The environment is particularly good and father and mother are most healthy. The family consists of this child and twins. This is an undoubted sport.

(31) Girl aged 13 yrs. 9 mths. Weight 71 lbs. Height 4 ft. 11½ inc. A tall girl of exceedingly poor nutrition. The chest is narrow and hollow and the arms and legs are very wasted. The father is stated to be the subject of chest attacks. He is a publican and farmer and the girls environment is very good.

(32) Boy;--- poor pinched and feeble. The mother is mentally deficient, and the father is a careful man, but earns only 12/6 a week.

(33) Girl aged 5 yrs. 3 mths. Weight 32 lbs. A delicate feeble child of notoriously defective nutrition. Mother was 35 when child, (her first) was born, and it was a seven mths. child. The mother is delicate and the father is strong. The home and wages are good.

(34) Boy aged 6 yrs. 4 mths. Poor physique and nutrition. Is markedly tubercular and comes of a tubercular stock. Father's wages 14/- a week.

(35) Girl aged 4 yrs. Weight 26 lbs. Height 2 ft. 9¾ inc. A very fragile child with very defective nutrition. One of a family of eight, brought up on a weekly wage of 12/- with £4. 10s. a year for rent. Mother looks a very delicate woman and all

children are said to be delicate. There are two bedrooms for two adults and seven children.

(36) Boy aged 7 yrs. 2 mths. Weight 42 lbs. Height 3 ft. 7 inc. A poor lad with a pigeon chest. He is one of a family of 12 and is the only delicate member of the family. The father is a labourer earning 14/- a week and suffers from bronchitis and asthma. The mother is strong.

(37) Girl aged 10 yrs. 5 mths. Weight 63 lbs. Height 4 ft. 2 inc. A delicate child with bronchitis. Comes of a delicate family. The environment is decidedly above the average.

(38) Boy aged 6 yrs. 1mth. Weight 28 lbs. 4 ounces. Height 3 ft. 3¼ inc. This is a small and poorly developed child of notoriously defective nutrition. One of a family of 3. There is a well-marked history on the mother's side of defective development and general malnutrition. The father earns 14/- a week.

I refrain, in this paper, from giving further cases. I could quote many more, but I think I have given sufficient for my purpose. It was my intention at first to give 100 of each, but, I do not deem any more useful purpose would have been served by giving so many. There would be considerable repetition and a perusal of a long series of cases would become monotonous.

I think anyone reading a history of those cases, will be struck with several outstanding features.

(1) That when stock is good, environment, short of the impossible, matters but little. I refer the reader again to the first case of all I quote.

(2) That when stock is not good, that even good environment, in which individual care, suffiency etc., are indisputably available, plays but little part in the production of nutritional

results.

(3) That when stock is bad and environment is bad, the worst of all results in nutrition ~~are~~ is obtained.

Over and over again you will find in those cases children who are living in what can only be primary poverty, who are living in houses which are utterly destitute of comfort, of hygiene, and of those auxiliaries which help to make life something better than annmal existence, in a state of excellent nutrition. You will find at the same time that the stock is a good one, and that the child has entered life's contest with an ~~environment~~ endowment of resisting energy prepared to combat the most adverse conditions of life and be triumphant in the contest.

Over and over again you willfind in those cases children who have been born into better conditions of life, some of them bordering on the affluent, but who lacking the endowment of the others have neither the ready reserve not are they even capable in favourable circumstances of equalising the metabolic processes of life, and they fail nutritionally.

And again ~~we~~ you frequently find amongst those cases, children who starting ata disadvantage by reason of a faulty heritage, are launched on the world in most unfavourable conditions of life. These children having no resistance would be but deteriorate in the better surroundings. Added to their hereditary malnutrition is the great disadvantage of bad environment, and they present us with those pitiable spectacles of malnutrition which one finds in the ranks of the Elementary School Children of rural Wiltshire.

Another feature which one notices in a perusal of the cases, is the number of sports. Cases, often one in a large family, in which the heredity is unquestionably good, and in which the environment is favourable, appear every now and again,

only be necessary to trace the family tree back a certain distance to discover the cause. I think in all cases a progenitor at a nearer or more remote generattion would be found to be lacking in the nutritional qualities which accompany good health.

Lastly one notices that frequently in a large and healthy family a member whose nutrition fails. His parents may be most healthy, and it would appear to be a case of environment alone producing a defective result. I think that other sources of defective cause may be looked for. I have mentioned sports above. I have also mentioned the nutritional activities of the mother may and have been affected during child-bearing as would be the came when children have followed each other in rapid succession.

I have now come to the concluding words of this paper; i.e. the summing up of the evidence for and against heredity and environment in the production of nutritional results.

David Heron in "The Eugenics Laboratory Memoirs"; says, "Given a constant type of parent, what effect has environment on the child? Stating the problem analytically we have the following factors; The measure of any character in the parent, p the measure of any character in the child, c and, e the environmental factor. We have then r_{cp} the correlation between the child and parent for the character under consideration, the intensity of heredity; r_{ep} the correlation between the environment and the character of the parent; and the r_{ec} correlation between environment and the character of the child.

Now if we wish to find the relationship between the character under consideration, in the child, and the environment, independently of the measure of the character in the parent; i.e. independently of the influence of heredity we must use the partial correlation co-efficient;

$$p\,R_{ec} = \frac{r_{ec} - r_{ep}\,r_{ep}}{\sqrt{1-r_{ep}^2}\,\sqrt{1-r_{ep}^2}}$$

This value would be zero if the relationship $r_{ce} = r_{ep}\, r_{ep}$ held, and we are fairly certain that the value r_{ep} the correlation between parent and child for any character does not widely differ from .5. Unless the r_{ee} comes out greater than .5, we cannot argue without investigating the relationship between the parent and environment, that r_{ee} is significant; it probably is if is greater than .3 or .4. But for such values as .00 to .20 actually found, the only safe conclusion seems to be that environment has very little, if any, influence, and what influence it has may be by an indirect effect of heredity acting by environment selecting the parents."

This point I think is well illustrated in the fact that nutritionally the children of the fathers with such a healthy trade as farm labouring, which entails the actual work on the land, are better nourished and of better stature and weight than those who follow other occupations which are less healthy. This relationship need not, however, depend on the respective occupation of the parents, because the one works actively on the land in the open air, and the other attends only to the cattle. The latter is physically inferior and will have inferior offspring.

An investigation was made by Dr. W. Leslie Mackenzie and Captain A. Foster, into the stature and weight of some 78,000 Glasgow School Children, in ~~the~~ relationship to the housing of the children. They arrived at the result that boys who live in one roomed houses are 11.7 lbs. lighter and 4.7 inches amaller than boys who live in four-roomed houses, where girls from one-roomed houses are 14 lbs. lighter and 5.3 inches shorter thanthe girls from four-roomed houses. These figures were made without any corrections for difference of age distribution, and are based on average heights and weights of children of all ages. When a correction haa been made the difference of range is less thana half, and

it cannot be for a moment admitted that the differences still apparent are due to differences of environment. No notice is taken of the fact that a large proportion of the people in the one-roomed houses are the physically unfit, that by reason of their unfitness to contend with the competition of the unfit with the fit they have been forced to seek the humbler dwellings by means of their impoverished resources. Nay more, I almost assert that if the heredity in the one-roomed houses was as good as the heredity in the two-roomed houses the disparity in figures already given would disappear.

I have given David Heron's problem and I have discussed the findings of Dr. Leslie Mackenzie and Captain Foster. It only remains for me to say what I deduce from my own findings as set forth inthese pages.

The environment in the average Wiltshire home is bad. The living is poor, and the individual care which the young receive is very decidedly below the average, yet there is no evidence to show that the nutrition of the average Wiltshire child is below the average of other people of similar stock. The heredity is good, the stock being of the best Wessex Anglo-Saxon.

In some areas the conditions are decidedly worse than in others while the stock is the same. There is no evidence to show that where the conditions are worse, there is any inferiority in the nutrition.

Geologically some of the areas widely differ, some being on downland where damp conditions do not enter into the calculations, others being in the valleys where the water stagnates and drainage of building land was not practised when the houses were built. There is no evidence forthcoming that the

nutrition of the children living on the hills is better than those living in the valleys.

Where the heredity of individual cases was investigated it was always found that children of a good stock were nutritionally well developed even although their environment was very bad. On the other hand it was found that children of inferior heredity were of poor nutritional development whether the environment was good, bad, or indifferent.

It is obvious therefore that the part played by heredity is infinitely greater than that played by environment and that the nutrition of the rural school child is a natural hereditary endowment rather than an acquired characteristic.