TABLE II.—*Approximate Rates of Mortality from All Causes per 1,000 Living (Persons)*

Age in Years :	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-10
England and Wales	61.4	12.9	5.6	4.2	3.3	2.8	2.4	1.9	1.6	1.4
Germany	90.0	9.0	4.5	3.2	2.6	2.2	2.1	1.9	1.6	1.5

notably Halliday (Medical Research Council Special Report Series, No. 120), have called attention to the importance of the housing factor in determining the rate of mortality from measles, and the Chief Medical Officer of the Ministry of Health has discussed the problem of the pre-school child. Although, as he noted, the English rate of mortality at this age has improved enormously during

TABLE III.—*Death Rates from Selected Causes of Death at Different Ages in England and Wales for the Years 1932-5 expressed as Percentages of those in Germany. (Germany = 100 per cent.)*

Age Groups :	0-1								1-4								5-14							
	1932				1933				1934				1935				1932				1933			
	M		F		M		F		M		F		M		F		M		F		M		F	
	Disease group																							
Infectious disease	119	119	95	92	106	112	72	79	208	205	151	205	179	188	105	106	120	119	111	115	63	73	82	76
Nervous system	34	30	36	34	48	45	46	44	77	85	77	85	72	62	69	68	144	127	131	148	129	132	101	110
Respiratory system	113	105	107	106	112	110	98	101	187	199	187	199	170	170	117	125	147	180	133	164	134	133	107	100
Digestive system	83	77	101	94	83	85	81	77	107	125	107	125	115	96	108	107	97	93	64	69	94	86	76	76
All causes (persons)	82		83		89		83		151		140		141		103		121		128		111		94	

The rates are in Table I. It will be found that though down to the sixth month of life the English rates are distinctly favourable they then worsen, and in the last quarter of the first year of life exceed the German rates. The swing is considerable—from a deficit of some 20 to 30 per cent. in the first six months of life to an excess of 10 to 20 per cent. in the last quarter of the first year. The apparent advantage of England and Wales in the year 1935 in the fourth quarter of the first year of life may well be due to the imperfect method of estimating the rate, for in Germany births increased largely in 1934 and 1935.

A comparison of the quinquennial rates at ages 1-5 showed again an advantage for Germany, but I desired to make a finer comparison. As the German data are not subdivided in the same way as the English data, which show rates at ages 1-2 and 2-5 years, I made the following rough experiment. I related the deaths as published in England and Germany in single years of age for the triennium 1932-4 to, respectively, (1) the estimated populations at single years of age as given by the English Registrar-General, and (2) the enumerated populations of the German Census of 1933. One has then the figures of Table II. From the second to sixth year of life the German advantage is substantial; the English rate of mortality in the second year is more than 40 per cent. greater than the German rate, and from age 2 to 6 it is still some 25 to 30 per cent. in excess.

For the whole of the first year the ratio of mortality calculated in this way is, on the other hand, 32 per cent. in favour of England. Owing to this, and especially to the great English advantage in the first months of the first year of life, when mortality is at a maximum, it would still be true, in spite of the relatively high rates in England in later childhood, that the proportion of live-born children surviving to the age of 10 would be slightly greater in England (very approximately in the proportion of 905 to 884). But the change-over is of interest. In the age group 5-15 Germany also has some advantage for the years considered.

In Table III the rates for the principal groups of causes in England and Wales are given as percentages of the contemporary German rates. It will be seen that the English disadvantage in the age group 1-4 inclusive is greatest in the group of infectious diseases and in diseases of the respiratory system. Analysis of the former shows the principal contributors to be measles and whooping-cough.

I am of course aware that it would be dangerous to draw firm conclusions from a comparison restricted to a short series of years in which, as I have said, epidemic diseases have been a main factor of the difference. But the results suggest some reflections. English writers,

the last thirty years, it seems possible that the conditions are capable of further improvement, and that a comparison of administrative systems might be instructive.

RELATION OF VITAMIN D AND MINERAL DEFICIENCIES TO DENTAL CARIES

BY

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In view of the Medical Research Council's recent investigations into vitamin D deficiencies in dental caries the results of the examination of the teeth in ten cases of severe clinical rickets, with radiological confirmation, are reported from an examination of children in the Kangra District of the Punjab, Northern India.

A diet and health survey of this district recently carried out by the Public Health Department and by Dr. D. Curjel Wilson has shown a high incidence of rickets and osteomalacia and definite vitamin D, calcium, and phosphorus deficiencies in the diet of most of the population there. Fifty children with rickets were collected by Miss Edgar of the Canadian Mission Hospital at Palampur and examined clinically and dentally by both of us. A very low incidence of dental caries and hypoplasia was noted. A number of these children were conveyed by car to a neighbouring hospital thirty miles away for radiological examination, and the following results were obtained.

Results of the Investigation

Case 1.—A female child aged 4. Severe clinical rickets. Bowed legs, enlarged epiphyses, head bossing. Skiagram: advanced rickets; irregular enlarged epiphyses; cupping; decalcification. Teeth: twenty deciduous present; number of cavities, two, in $\overline{E}\overline{E}$; arches well formed, no irregularities; hypoplasia (gross naked-eye), nil.

Case 2.—A female child aged 11. Severe clinical rickets. Enlarged epiphyses, curved legs, ribs "rosary." Skiagram: advanced rickets; irregular badly ossified enlarged epiphyses;

decalcification; green-stick fracture of ulnar shaft. Teeth: ten deciduous and seventeen permanent present; number of cavities, four (defective fissures only), in $\frac{6}{6} \frac{6}{6}$; arches well formed, no irregularities; hypoplasia, *nil*.

Case 3.—A female child aged 11. Severe clinical rickets. Enlarged epiphyses, severe curvature of legs, ribs "rosary." Skiagram: advanced rickets; irregular epiphyseal line; cupping of epiphyses; decalcification. Teeth: seven deciduous and nine permanent present; number of cavities, *nil*; arches well formed, minor irregularity (angles Class I); hypoplasia, *nil*.

Case 4.—A female child aged 9. Severe clinical rickets. Curved tibia, knock-knees, epiphyses enlarged, ribs "rosary." Skiagram: irregular epiphyseal line; cupping of epiphyses; decalcification. Teeth: twelve deciduous and nine permanent present; number of cavities, *nil*; arches well formed and no irregularities; hypoplasia—pitting of deciduous teeth, slight opacity of enamel of permanent teeth.

Case 5.—A female child aged 8. Moderately severe rickets. Epiphyses enlarged. Skiagram: irregularity of epiphyses; decalcification. Teeth: eleven deciduous and twelve permanent present; number of cavities, one (defective fissure only) in $\frac{1}{6}$; arches well formed; slight crowding, $\frac{1}{3}$ in buccal occlusion; hypoplasia—pitting of deciduous teeth only.

Case 6.—A female child aged 10. Moderately severe rickets. Epiphyses enlarged. Skiagram: irregularity of epiphyses, which are "cupped"; decalcification. Teeth: ten deciduous and twelve permanent present; number of cavities *nil*; arches well formed, no irregularities; hypoplasia, *nil*; chronic suppurative periodontitis.

Case 7.—A female child aged 11. Severe rickets. Severe knock-knees, enlarged epiphyses, "rosary," and head bossing. Skiagram: irregularity of epiphyses, which are cupped; epiphyses enlarged; decalcification. Teeth: twenty-eight permanent present; number of cavities, one (defective fissure only), in $\frac{1}{6}$; arches well formed, no irregularities; hypoplasia—slight opacity of enamel, no pitting; chronic suppurative periodontitis.

Case 8.—A male child aged 13. Severe rickets. Bow legs, epiphyses enlarged, "rosary." Skiagram: irregular epiphyses; decalcification. Teeth: twenty-eight permanent present; number of cavities, two (buccal pits only), in $\frac{6}{6} \frac{1}{6}$; arches well formed, no irregularities; hypoplasia, *nil*.

Case 9.—A female child aged 8. Moderately severe rickets. Bow legs, enlarged epiphyses, "rosary." Skiagram: irregular epiphyses; decalcification. Teeth: sixteen deciduous and eight permanent present; number of cavities, *nil*; arches well formed, no irregularities; hypoplasia, *nil*.

Case 10.—A female child aged 12. Very severe rickets. Legs—severe curvature, epiphyses enlarged. Skiagram: very irregular epiphyses, cupping very marked; severe decalcification. Teeth: ten deciduous and twelve permanent present; number of cavities, four (defective fissures only), in $\frac{6}{6} \frac{6}{6}$; arches well formed, no irregularities; hypoplasia, *nil*.

The results of these examinations are summarized in the following table.

Thus in ten cases of rickets, radiologically confirmed, there were four children whose teeth had no caries, and in the six other children a total of fourteen cavities were found, an incidence of 1.4 cavities per head in ten children. There were in the group ninety-six temporary teeth and 135 permanent teeth. Two cavities were found in the ninety-six temporary teeth, and twelve cavities in 135 permanent teeth, a total incidence of fourteen cavities in 231 teeth. Macroscopic hypoplasia was noted in only three of the cases.

These children came from a hill district and live in primitive conditions. The preliminary report of the diet survey of the district states that "the diet consists mainly of carbohydrates with relatively small proportions of protein and fat. Meat and fruits are almost entirely absent from the diet. Very small quantities of milk and vegetables are consumed." Sugar is rarely eaten. Two meals only are eaten daily, of rice and "chapatti" made from unmilled wheat, ground to flour in each home. Rickets and osteomalacia are very common in the population. The cases reported above are examples of "late rickets." It is proposed to investigate a group of osteomalacia cases for dental caries at a later date.

From the investigation we conclude that vitamin D deficiency alone does not cause either dental caries or hypoplasia of the teeth. We were impressed by the excellent formation of both teeth and jaws of this group of children. This low incidence of caries with excellent teeth and jaw formation is characteristic of the peasant of the Punjab, so far as our knowledge goes. We have not seen, in England, America, or elsewhere, such well-formed jaws and teeth with this low incidence of caries.

Comparison with Other Groups Examined

It is of interest to note, in another investigation made by one of us (C. D. M. D.) in the city of Lahore on a group of 800 school children of the Indian "middle class," having a diet more in keeping with European standards, including soft refined carbohydrates and sugar, eaten three or four times daily, that the incidence of caries was very much higher than in the rickets cases reported in this paper. An average of six cavities per child was noted in the group of 800 children.

In another group of twenty-six poor Indian children of an Indian orphanage in Lahore, examined clinically and dentally by both of us and eating a low diet resembling that of the Kangra children reported above, the incidence of caries was 2.27 cavities per mouth. Eight of the twenty-six children had no caries. The average haemoglobin content of the group was only 63 per cent. The anaemia

Case No.	Age	Clinical Rickets	Skiagram	Teeth Present		Cavities		Hypoplasia
				Temporary	Permanent	Temporary Teeth	Permanent Teeth	
1	4	++	++	20	—	2	—	—
2	11	++	++	10	17	—	4 (defective fissures only)	—
3	11	++	++	7	9	—	—	—
4	9	++	+	12	9	—	—	Present in temporary and permanent teeth
5	8	+	+	11	12	—	1	Present in temporary teeth
6	10	+	+	10	12	—	—	—
7	11	++	++	—	28	—	1	Present in permanent teeth
8	13	+	+	—	28	—	2	—
9	8	+	+	16	8	—	—	—
10	12	+++	+++	10	12	—	4 (defective fissures only)	—
Totals				96	135	2	12	

was of the hypochromic iron-deficiency type. Ferri et ammon. citras in large doses was given to all the children of the orphanage, with the result that the haemoglobin rose to an average of 92 per cent. within one month, the diet being unaltered during this period.

Further, in the fifty Kangra children examined two showed severe hypoplasia and dental caries, the mouth condition resembling that seen commonly in Europe and America. The clinical notes are as follows:

A female child aged 4 years. History of discharging ear since birth, the discharge being still present. Cod-liver oil had been given since birth, as the child lived in the hospital compound. There were no clinical signs of rickets. Skiagrams of epiphyses were normal. Teeth: twenty deciduous present; number of cavities, fourteen, in $\frac{EDCBA}{ED} \frac{ABCDE}{DE}$; arches well formed, no irregularities; severe hypoplasia.

A male child aged 5. History of pneumonia in infancy followed by frequent chest colds. Slight bowed legs and enlarged epiphyses. Skiagram: irregular epiphyseal line; cupping; decalcification—that is, clinical and radiological rickets. Teeth: twenty deciduous and two permanent present. Number of cavities, ten, in $\frac{EDCBA}{ED} \frac{AB}{D}$; anterior teeth worn to gum line, showing definite arrested caries; arches well formed, no irregularities; severe hypoplasia.

It is significant that these two children (who had had respectively severe sepsis and pneumonia from birth) were the only two cases with severe hypoplasia and dental caries.

Conclusions

These investigations show that almost perfect teeth with a very low incidence of dental caries and little gross hypoplasia are found in a group of children with severe clinical rickets, radiologically confirmed, in the Kangra District of the Punjab.

The diet of the children is definitely deficient in minerals and vitamin D, and in view of the recent survey by the Public Health Department in this district and the widespread incidence of osteomalacia and rickets there is good reason to believe that the maternal diet also was deficient in calcifying properties during pregnancy and lactation.

From the investigation it is seen that diets deficient in calcium and phosphorus and the fat-soluble vitamins and rich in "anti-calcifying" cereals do not lead to a greater susceptibility to dental caries under the conditions reported.

The very low caries incidence in the Kangra District and in the orphanages investigated in Lahore, together with the physical nature of the food eaten, lends support to the "detergent diet" theory of Sim Wallace, which postulates that the physical nature and cleansing action of the diet is of more importance than other factors in the prevention of dental caries.

Furthermore, sepsis and the exanthemata of childhood would seem to be more potent factors in the causation of hypoplasia and caries than vitamin D and mineral deficiencies.

It is proposed to publish a detailed report of the investigation of Lahore school children at a later date.

The first award of the Treacher Collins Prize, value £100, has been made by the Ophthalmological Society of the United Kingdom to Dr. T. Hewitson Brown (Edinburgh) for an essay on "Cerebrospinal Disease and its Relation to the Optic Nerve." Essays by Dr. S. Nevin (King's College Hospital) and Dr. N. S. Alcock (British Postgraduate Medical School) were warmly commended.

Clinical Memoranda

Misguided Efforts at Abortion

The following cases were met with in the gynaecological ward of St. James's L.C.C. Hospital during the past two years.

FOREIGN BODY IN BLADDER

Case 1.—A 4-para, aged 26, eight weeks pregnant, was admitted with a history of having attempted three days before to pass a piece of elm bark into the uterus. The instrument disappeared, and symptoms of pain on micturition and haematuria followed. Examination of the urine showed blood, but the culture was sterile. Under general anaesthesia the urethra was dilated by Hegar's dilators so that it admitted a little finger. The stick was manipulated by a finger in the bladder and pressure of the other hand suprapubically so that it lay with one end at the internal urethral orifice. A sponge forceps was then passed to what was considered the requisite level and the end of the stick seized and pulled forth. The operation caused moderate laceration of the urethra. Urinary antiseptics and irrigation with oxycyanide of mercury, 1 in 10,000, were employed, and a self-retaining catheter was inserted for two days. The patient went home one week after operation with complete control of micturition and no urinary symptoms.

Case 2.—A 2-para, aged 28, eight weeks pregnant. There was no sign of any injury to the external meatus. A piece of elm bark had been in for several days, and the bladder was in a condition of acute cystitis. The bark, measuring 6 inches by $\frac{1}{2}$ inch, was removed in the same way as above.

Case 3.—A primipara, aged 31, five months earlier had thought herself pregnant, and to procure miscarriage had passed a piece of elm bark accidentally into the bladder, and there it remained. She was rewarded by the regular reappearance of the menses, but dysuria and haematuria persisted. Actually she became pregnant about three months after introduction of the elm bark. On sounding the bladder it was possible to make contact with a hard object. The operation described above was carried out, but with much laceration of the urethral mucosa; for the bark, measuring 2½ inches by $\frac{1}{2}$ inch, was entirely encrusted with phosphatic deposit. In spite of this the patient was able to micturate with little discomfort after two days. Irrigations were continued for a week, and the patient was discharged.

These cases show the tolerance of the bladder for comparatively large pieces of wood, the distensibility of the female urethra, and the rapid return of sphincteric control. The transurethral route was chosen as being less likely to promote miscarriage than suprapubic cystotomy. All three patients were readmitted at term and delivered normally of healthy children. There was no recurrence of urinary symptoms during pregnancy, labour, or puerperium.

INJURY TO RECTUM

The fourth case is one of injury to the rectum.

Case 4.—The patient, aged 24, had missed a period for two weeks, and for one week she had been constipated. A Higginson's syringe has been used per vaginam and the nozzle had met and perforated the rectal and vaginal walls, which were bulged forward by hard faeces. The patient expected pain and blood, and she got them. The injection caused the bowels to move, and on admission faeces were being passed freely per vaginam. The speculum showed a grey, ragged slough occupying most of the upper half of the posterior vaginal wall, and at the centre of this area was a fistula through which rectal mucosa could be seen. The uterus was bulky, but pregnancy was not diagnosable till later. The fistula was treated by rectal and vaginal douches of dettol twice daily, and in two weeks the wound was healthy and