The apparent benign clinical course of lipomelanotic reticulosis (Pautrier and Woring, 1937; Jarrett and Kellett, 1951) contrasts sharply with the typical fulminating course of reticulum-cell reticulosis. The review of Jarrett and Kellett's lipomelanotic series indicates that nine patients have recovered—so much so that this diagnosis would not now be entertained.

Clinically, therefore, the present cases appear to lie between these extremes, having run a chronic course for several years. Although at present showing some spontaneous remission, it is possibly significant that Case 1 has slowly deteriorated since first seen.

Wilson and Fielding (1953) were hesitant about applying the term "reticulosis" to Sézary's syndrome. They suggest that it is similar to lipomelanotic reticulosis in that it represents a non-specific response to cutaneous disturbance which "is not, at least to begin with, malignant in character." We consider that Sézary's syndrome is more than simple reactive hyperplasia. It is an early phase of malignant reticulosis primarily affecting the skin and superficial lymph nodes. Involvement of the deeper structures is probable provided death does not occur from intercurrent disease.

The ultimate aetiology of this syndrome, as of all reticuloses, remains obscure. Careful study of prolonged conditions such as this, linking reactive states to irreversible malignancy, may possibly contribute to knowledge of the latter.

Summary

Two further cases of Sézary's syndrome are described and the five previous cases reviewed.

It is thought to be a local reticulosis intermediate in phase between benign reaction and frank malignancy.

The chronicity is possibly due partly to its "pre-malignant" character and partly to the organ affected—the skin and superficial lymph nodes.

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Speaking at a graduation ceremony for medical students at St. Andrews University on January 14, Principal T. M. KNOX, vice-chancellor of the University, uttered a warning against the modern tendency to divert professional men from the practice of their profession into administration. "It used to be said in scorn about teachers," he said, "that they taught only because they could not do. One might perhaps have expected an equally scornful remark about administrators." But administration now presented itself in such an attractive guise that many professional men were lured away from the exercise of their professional skill into an office chair. "I am not sure that this is a sign of health in the body politic." "In fact," Principal Knox went on, "administration is just a necessary evil, not an end in itself, but a means to the freedom and progress of professional work, and, whatever the difficulties of administration may be, it is a great deal easier than the exercise of professional skill."—*Scotsman*.

INCIDENCE OF DENTAL CARIES IN CHILDREN UNDER 5 YEARS OLD

BY

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Amongst the few surveys of the incidence of dental caries in children under 5 years old that have been published in this country are those of Knowles (1948) and Jackson (1952). Frequent reports have been made on the dental condition of children aged 5 and over, in particular the studies of Mellanby and Coumoulos (1944, 1946) and Mellanby and Mellanby (1948, 1950, and 1951).

In 1948 it was decided to carry out a series of surveys of the dental condition of the children in the city of Liverpool day nurseries. Four static surveys were completed during the period 1948–52, and the findings are presented in this paper.

The primary aim of these surveys was to determine the incidence of dental caries in children under 5 years old, before they passed into the regular care of the school dental service. A high caries attack rate would, without doubt, prejudice the chances of maintaining the dental fitness of these children by adding to the already heavy burden of dental work now being undertaken. Further, it would be possible to estimate on the basis of the results the number of dentists required to maintain a satisfactory treatment service.

As the second aim, it was desired to ascertain whether any variation in incidence of dental caries would occur over a period of years and to speculate upon possible causes of such variations. For example, a poor state of dental health might be attributed to the possibility of dietary errors during pregnancy and lactation affecting the resistance of tooth structure to caries attack. Alternatively, or in addition, post-natal dietary errors might create in the child environmental conditions in the mouth which would favour the carious process.

Children under 5 provide a useful measure of pre- and post-natal influences. The deciduous teeth begin to be mineralized *in utero* during the eighth week. The completion of the mineralization of the deciduous dentition occurs after birth, during the third year. At about 6 years of age the first permanent molar teeth erupt in a position distal to the deciduous second molar. This is followed shortly afterwards by the shedding of the deciduous incisors. Thus, by confining the investigation to children under 5 the complications of mixed (deciduous and permanent) dentitions are avoided.

Materials and Method

Liverpool Day Nurseries.—These are administered by the maternity and child welfare department under the city medical officer of health. In 1950 the number of day nurseries was increased from 13 to 15, and in 1953 it was reduced to 14. The nurseries are located in widely separated areas, which vary from the poorer districts to the more salubrious parts of the city. The number of children accommodated on a daily basis varies from 40 to 70. The eligibility of children for places in the day nurseries depends on the circumstances of the applying parent. The object is to provide daytime nursery facilities which will enable the parent to go out to work. At one time children who had been accepted could remain at the day nursery until school age, but this policy

was changed in 1951. It is now the intention that accommodation should be available for restricted periods of time until the parents can make other arrangements. The estimated annual turnover is about 15%. The nurseries open at 6.30 a.m. for the admission of children and close at approximately 6.30 p.m., after the children have been collected by the parents. At present the daily charge is three shillings.

Feeding Arrangements.—The children are given three meals at the nursery. Breakfast and tea are prepared and cooked at the individual nurseries. However, the midday meal is prepared, cooked, and then delivered in insulated containers from central kitchens by the school meal service. The vegetables are cooked at the nurseries. In addition, the children receive cod-liver oil, orange juice, and one pint (570 ml.) of milk daily. There are no between-meal snacks whilst the children are at the day nursery. The only exception is that sweets of the dolly mixture type are given after inoculations. Incidentally, many of the children arrive eating sweets, buns, or cakes, and often are given some form of confection by the parents on leaving the nursery at the end of the day. Knowles (1948) reports a similar practice in the London area nurseries. The reason for this may be the desire of the parents to establish or re-establish themselves in the affections of these very young children after long daily separations. It is known, too, that many of the children are similarly indulged at the week-ends.

Dental Standards.—All examinations were carried out by me, using mirror and probe in a good light. New Ash's Clinic No. 17 probes were used, being discarded after 15 to 20 examinations. The probe is fairly coarse, with a short taper to its point. I recorded findings on a simple chart. Caries was recorded, showing the surface(s) of the tooth involved, and graded as follows: Grade 1: cavities which would definitely admit the point of the probe; doubtful cavities were not included. Grade 2: cavities involving up to one-third of the crown of the tooth. Grade 3: cavities involving more than one-third of the crown; missing teeth due to extraction were placed in this category. Fillings were recorded as caries and scored accordingly. The condition of the gums was also recorded, and the severity of gingivitis was graded 1, 2, and 3. Co-operation was enhanced if the examinations were carried out in the presence of as many children as possible. The older children were usually examined first; the younger and doubting children usually followed without demur. Only four toddlers resisted all manner of coaxing to allow examination during the five-year period. Much of this success was due to the kind yet firm handling of the children by the matrons and their excellent staffs. A simple method was used to examine the babies. I sat facing the nurse and the baby was placed on our knees with its head towards me. This inversion of the baby proved an easy method of obtaining a view of the upper teeth.

Numbers Examined.—The number of children examined is given in Table I. In the first two examinations only those children were examined who were likely to stay a reasonable length of time. This accounts

TABLE I.—Children Examined

Age	Dec., 1948	May, 1949	June, 1951	May, 1952	Total
Under 2 ..	33	21	151	152	357
" 3 ..	146	136	153	197	632
" 4 ..	117	149	134	148	548
" 5 ..	28	52	156	136	372
Total ..	324	358	594	633	1,909

for the low figures in the 4-5 age groups in the 1948 and 1949 examinations. When the longer stay policy was abandoned a progressive survey was no longer possible. Thereafter all children were examined.

Results

The results of the series of four examinations are presented by age groups (Table II). The percentage of caries-free children in the series of examinations shows a similar trend for all age groups. There was a definite drop in the percentage in May, 1949, followed by a rise in June, 1951, to a higher level than in December, 1948.

The average D.E.F. (decayed, extracted, and filled) teeth per child has been calculated. The trend of caries attack is similar.

The effect of a small number of children each having a large number of decayed teeth would be to raise the overall average of D.E.F. and perhaps show a false position. This effect can be minimized by expressing the findings in terms of D.E.F. per 100 teeth. However, the trend is again similar.

The susceptibility to decay of individual teeth varies. The results of all four examinations have been pooled, and are presented by age groups (see Chart). There is a steady rise, though at different rates, in the susceptibility of all teeth with the increase in the age of the children. The pattern of the results approximates the findings of Knowles (1948). The high susceptibility of the deciduous molars, especially the second

Caries susceptibility of individual teeth by age groups for both upper and lower arches. A=central incisor. B=lateral incisor. C=canine. D=first molar. E=second molar.

TABLE II.—Results of Four Surveys

Date Examined:	Dec., 1948				May, 1949				June, 1951				May, 1952			
Age:	-2	-3	-4	-5	-2	-3	-4	-5	-2	-3	-4	-5	-2	-3	-4	-5
Percentage caries-free children ..	84.8	58.9	29.0	14.8	76.2	52.5	25.8	5.9	91.5	70.2	40.1	24.0	90.6	66.8	39.0	27.9
Average D.E.F. per child	0.3	1.1	2.2	5.0	0.6	1.6	2.6	4.7	0.2	1.3	2.4	4.0	0.2	1.8	3.5	4.1
D.E.F. per 100 teeth	1.8	5.8	10.8	23.7	3.4	7.9	14.3	22.2	0.9	7.7	12.4	20.6	1.6	7.18	18.9	20.4

D.E.F. = Decayed, extracted, or filled teeth.

molars, is particularly striking when considered in terms of the length of time these teeth are exposed to the oral environment. It is generally accepted that the eruption times of the deciduous dentition are: incisors, 6-10 months; canines, 16-20 months; first molars, 12-16 months; and second molars, 20-30 months (Kronfeld, 1939). Occasionally eruption times fall outside these dates. It is possible that enamel formed at about the time of birth is less resistant to caries. Rushton (1933) has shown that the disturbance of birth causes a change in the enamel. Histological sections show a line of demarcation between the pre-natal and post-natal enamel. It is an appalling thought that 7% of the second deciduous molars are decayed before the children are 2 years old, and that, even worse, over 45% are decayed before the children reach 5 years. Comment is made below on this point.

The severity of caries was assessed in accordance with the grades referred to above. The results of the four examinations for all age groups have been pooled. Of the 876 decayed first molars, 28% were grade 1, 46% grade 2, and 26% grade 3. Of the 1,808 decayed second molars, 43.5% were grade 1, 38.5% grade 2, and 18% grade 3.

Finally, only 11 children out of the total number of 1,909 had any fillings present. The gum condition of the children was generally good, and less than 2% suffered from clinically detectable disturbances.

Discussion

The primary object of the survey, which was to ascertain the incidence of caries, has been achieved. It is reasonable to comment on these findings relative to all children, for it has not been shown that dental caries is any less prevalent at either end of the social or financial scale. The only exception is that children fully resident the year round in orphanages, institutions, and the like have a much lower incidence of decay (Hewat, 1931, 1932). These latter children constitute only a very small fraction of the child population of the United Kingdom.

It is a sad reflection that all children who enter school have, on an average, five decayed teeth each. Thus the school dental service is faced with a considerable problem.

The live-birth rate in Liverpool over the past ten years averages approximately 16,500 a year (A. B. Semple, 1953, personal communication). This provides a basis for the calculation of the number of dentists required. Thus, $16,500 \times 5$ decayed teeth = 82,500 teeth requiring treatment in the 4-5-year-old children alone. It is possible for one full-time school dentist to complete, say, 3,168 fillings a year. Assuming one simple filling per tooth, 26 dentists would be required to deal only with this 4-5-year-old age group each year. Certain factors would affect this figure, such as extractions, root fillings, multiple fillings, difficult children, refusals, attendances to private dentists, etc. Even if allowance be made for these factors, the situation is impossible. In Liverpool the establishment of dental surgeons in the school service is 24, to deal with the whole school population and such pre-school children who do attend.

No doubt much the same situation exists in the majority of other similar communities. As a result multiple extractions of the deciduous teeth have to be carried out so that time may be devoted to the preservation of the permanent teeth of the older schoolchildren. The consequence is that large numbers of children become dental cripples with impaired mastication and malocclusion of the permanent teeth due to the early loss of the deciduous teeth. The deciduous molars should be retained until 9-10 years old, when the permanent premolar teeth which follow them are due to erupt. It is little wonder that the demand for the treatment for these irregularities far outstrips the supply of trained orthodontists. Nor is it surprising that full dentures are required by adults at an early age.

The increase of dental man-power, though essential to a certain level, does not provide a satisfactory solution to this

problem. The real solution lies in more dental research into the aetiology of dental caries, and, in the meantime, the application of every known measure which may bring about a reduction in decay.

The second object of these surveys was the examination of the trend of caries attack during the five years. The result is interesting (see Table II).

It is reasonable to assume that the influential factor responsible for this trend was not of pre-natal origin affecting tooth structure during formation. A common pre-natal factor would not have caused similar variations in all the age groups at the same time. Hence it is reasonable to examine the possible local or environmental factors which might be concerned.

Diet.—There were no significant changes in the main nutritional parts of the diet during the period. Some improvement in quality was introduced during 1951. No correlation is possible.

Supplements.—The prescribed amounts and quality of the vitamin supplements were maintained. At the nurseries the daily pint of milk was given regularly. Changes in the supplying contractors precluded any basis for correlation.

Sugar and Sweets.—The variations in the ration between 1942 and 1953 were examined. This is discussed below in detail.

Oral Hygiene.—No changes in the oral hygiene routine at the nurseries were made during the period.

Extraction Rate of Flour.—No correlation.

Availability of Fruit and Vegetables.—Usual seasonal variation; comment is made below on this point.

The presence of easily fermentable carbohydrate in the mouth has for some time been thought to be an important factor, and must be considered. Stones *et al.* (1954) completed a two-year study in 1951 on the effect of administering 22 oz. (620 g.) of sugar in addition to the ration. The extra sugar was given at meal-times only. There was no significant difference in the incidence of dental caries between the children receiving the extra sugar and those in the control group. On the other hand, the recent comprehensive studies carried out at the Lund Research Station at Vipeholm Hospital in Sweden are important, for the between-meal carbohydrate has been shown to be one of the most important factors in causing dental caries (Gustafsson *et al.*, 1952).

It is tempting, therefore, to speculate regarding the effect of the United Kingdom rationing of sugar and sweets during the period of the four surveys.

The May, 1949, examination, which revealed a drop in the percentage of caries-free children, took place about two to three weeks after the derationing of sweets on April 24, 1949. It may be remembered that there was such a wave of buying that plenty soon became a famine after a few weeks, and rationing was reimposed on August 14, 1949. Thereafter the size of the ration varied until derationing on February 5, 1953. It is interesting to consider whether the quantities of sweets obtained by these children during this period were sufficient to produce changes in the oral environment which hastened the carious process.

Little is known about the rate of development of carious lesions. It is a common clinical experience to find fresh carious lesions within a three-months period after children have been made dentally fit. In this case two weeks seems a short time for the development of lesions; nevertheless, speculation is provoked. Dental surveys of large numbers of children need to be undertaken every two to three weeks over a period of at least two years. Two problems may then be solved—the rate of development of clinically detectable caries, and the possible seasonal variations in the caries attack rate.

Careful study of the former must necessarily precede that of the latter. In the United States of America the greatest incidence of caries appears to occur in the autumn and winter, and the lowest incidence in the summer and spring (Price, 1930; McBeath and Zucker, 1938; Lathrop, 1941, 1943). This finding is not in agreement with the present study, and may be due to local differences between this country and America.

The seasonal variation, if it occurs, could be due to the variations in the composition of diet such as increased consumption of sweets during the periods when there is less inclination to eat fruit and vegetables or when supplies of the latter are restricted by supply or price. If the cause of such variation could be found, a real advance would have been made in dental research.

Conclusions

Children under 5 years suffer severely from dental caries and are in need of dental care. With any foreseeable available dental man-power in the next few years, the task is too great to be dealt with on a reparative basis, so that every possible preventive measure needs to be applied.

At the present date two measures are of proved value in reducing the caries attack rate. The fluoridation of domestic water supplies in the United States is so effective that the United Kingdom Mission of the Ministry of Health (1953) has recommended the inauguration of studies in this country.

The second measure, the plain water rinse after all food and drink, is of individual application. Thus to make this measure effective the education of all those having children in their care is essential. The medical profession is in a unique position in this respect. For it is to the medical practitioner that parents, teachers, and heads of institutions turn for guidance concerning the care of very young children.

The habit of drinking plain water after eating, whatever it may be, must be established in children before the first teeth erupt. As soon as possible they must be taught to rinse and to swallow the water. Experience has shown that children learn this procedure more quickly than when expectorating the water. In any case, the former method is the more socially acceptable. Three rinses should be carried out, forcing the water between the teeth to dislodge the food debris. This routine must never be varied. It must continue throughout the school terms and holidays alike, immediately after all meals, mid-morning or afternoon snacks, sweets, chocolates, and so on. Fibrous foods, such as apples, at the end of meals enhance the procedure. When possible the rinsing should be followed by tooth-brushing, but it must always be done after the last food or drink is taken at night.

I have prepared an instructional pamphlet (United Liverpool Hospitals, 1953). It is written in the simplest terms with deliberate repetition, and is designed to introduce this procedure of preventive dentistry to the mothers of very young children. Actually, the instructions apply to children of all age groups. The method provides, short of a return to primitive diets (Price, 1939), a logical means of reducing the caries attack rate, by the removal of the carbohydrate substance which is so essential to the existence of the organisms associated with the caries process. The regime is simple and clear enough for all to understand.

Summary

The findings of four surveys, during the period 1948-52, of the incidence of dental caries in children under 5 years old are presented.

These children suffer considerably from dental caries. Children on reaching school age have an average of five decayed teeth.

The school dental service faces an impossible task in maintaining a reparative service with the present numbers.

The results show that the trend of dental caries incidence follows a similar pattern in all age groups under 5 years. There was a drop in the percentage of caries-free children in 1949 compared with 1948, 1951, and 1952. An attempt is made to speculate on the cause of this drop.

In the conclusions that are drawn two preventive measures of proved value are mentioned. The fluoridation of domestic water supplies in the United States has been of such value that the United Kingdom Mission has recommended the initiation of fluoridation studies in this country. The second measure recommended is the plain water rinsing of the mouth after eating or drinking anything whatsoever. It should be taught to children before teeth erupt. The technique is described.

The education in dental health of all those who have children under their care is a primary need, whether they be the parents, teachers, or heads of institutions. The medical practitioner is in a unique position, for it is from him that guidance is sought initially in the dental care of these young children.

I wish to express my thanks and gratitude to Professor W. M. Frazer, late medical officer of health for the City of Liverpool, and Dr. Ruby M. Bell, late assistant medical officer of health in charge of the maternity and child welfare department, who kindly gave me facilities to carry out these surveys. Also to their successors, Professor A. B. Semple and Dr. V. J. M. Stark for their continuing interest. I wish to thank the supervising matron and all the matrons and staffs of the individual day nurseries who have helped so much in carrying out the work, Mr. W. Lee for photographing the chart, and Miss I. Rayner, who carried out the tedious task of collating the data for analysis. I am indebted to the Ministry of Food, Liverpool, who kindly supplied the sugar and sweet ration figures from which some data were obtained. Finally, I express my appreciation to Professor H. H. Stones, Director of Dental Education, School of Dental Surgery, University of Liverpool, for his help and encouragement.

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The PRINCESS ROYAL unveiled a plaque at No. 10, South Street, Park Lane, London, on January 21 to commemorate the residence in a house on that site of Miss Florence Nightingale. She lived there from 1865 until her death at the age of 90 in 1910. The proposal to erect the plaque was made to the London County Council's planning committee by the Florence Nightingale Hospital, the National Council of Nurses, and the Western Heritable Investment Co., Ltd., the occupiers of the present building. The Princess Royal, who is Patroness of the Florence Nightingale Hospital, was received by Sir CULLUM WELCH, chairman of the hospital, and by Lady WELCH and Mrs. A. C. E. KIMBER, joint chairmen of the hospital's appeal committee. A link with Miss Nightingale herself was provided by the presence at the ceremony of Mrs. ALICE CRAWLEY, who as Miss Cochrane was her secretary for some years. Also present were the chairman of the board of governors, St. Thomas's Hospital, and members of the executive and appeals committees of the Florence Nightingale Hospital, representatives of the National Council of Nurses of Great Britain and Northern Ireland, and the chairman of the London County Council.