(*Blood*, 1957, 12, 493) suggesting that haptoglobins determine the renal threshold for haemoglobin. However, no observations were made on patients with haemoglobinurias.

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SOME PAEDIATRIC PROBLEMS OF UGANDA

BY

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This paper deals specifically with problems of paediatrics that were met with during my experience in Uganda from 1954 to 1956 as the first liaison registrar to go there from Great Ormond Street. Many of these problems, however, are common to other parts of the tropics and subtropics. It is often overlooked that a majority of the children in the world are living in these underdeveloped regions, and that the bulk of the childhood mortality and morbidity is occurring there.

Whilst the diseases of temperate climates are largely present, indeed in florid form, many of the problems are conditioned by different genetic backgrounds, environments, food habits, customs, superstitions, and disease vectors, and the result is not merely a number of unfamiliar "tropical" diseases, but a pattern of child life, health, and disease which differs greatly from that of temperate areas. The whole subject of tropical paediatrics has been largely neglected in medical practice and teaching in these regions and even more so in the advanced countries. It is with the object of casting some light upon these problems that this paper is presented.

Background

Uganda is a somewhat under-populated country taken as a whole, supporting some five million people. With

a good average rainfall and mainly fertile soil, it could undoubtedly support far more. Sir Harry Johnston as early as 1900 considered twenty millions as a reasonable figure. The effects of disease and deprivation, however, have kept the population static, and until recently it was declining, owing to the combined effects of relative infertility and premature adult death.

There are some ten major tribes and many smaller ones, but from their way of life they can be divided into two main groups—those living mainly by settled cultivation of plantains (non-sweet bananas), cassava (tapioca), sweet potato, millet, and maize, and those living off their herds of cattle, of which the blood and milk are taken but rarely the meat. The agricultural peoples have a largely carbohydrate diet, with little protein and fat, and protein malnutrition is rife. The herdsmen have the protein at hand, but the children may still suffer through ignorance. In many areas cash incomes are very low, and there is a large population of immigrants from Ruanda-Urundi working for very low wages, so that very few Africans can afford to buy foods such as meat or milk.

Numerous customs, superstitions, and taboos exist in these peoples, many of them connected with ill-health. The subject must be approached with caution, since, as Jelliffe (1955) emphasizes, not all are harmful, and some may be beneficial, as, for instance, the widespread practice of prolonged breast-feeding in many parts of the tropics where cow's milk is not available. Others, however, such as female circumcision and many native remedies, are harmful. Medical practice is hampered by the great suspicion of blood transfusion and of taking blood samples.

Vital statistics are most unreliable owing to lack of trained personnel, inaccessibility of dwelling-places, lack of proper machinery, concealment of information, etc. The proportion of children is undoubtedly much higher than in more advanced countries because of the greatly reduced expectation of life. The infant mortality figure can only be guessed at, but most observers think it is well over 100 per 1,000 live births, and may reach 300 in places. Furthermore, the infant mortality does not give a good indication of the total child wastage, as many deaths occur in the early years of childhood. The main causes of child death are malnutrition of all forms, malaria, respiratory disease, gastro-enteritis, and sickle-cell anaemia. There is often a fatalistic acceptance of death in childhood which militates against cases being brought early for advice. It is probable that half the children die before reaching adolescence.

Medical Services

When the Uganda Medical Service was instituted the two major diseases to be faced appeared to be syphilis and sleeping sickness. The first proved to be less formidable than expected, but trypanosomiasis caused vast epidemics around Lake Victoria some fifty years ago, and a major achievement has been its reduction to the occasional clinical curiosity or diagnostic puzzle. Pathological services have been largely conditioned by the prevalent diseases, malaria and helminthiasis, except in the main centres.

The majority of sick persons, adult and children, are seen first or entirely by African personnel called medical assistants who have done a three-year course in elementary medicine and nursing. Some of these invaluable persons are in sole charge of rural dispensaries with up to 30 or 40 in-patient beds, with only monthly visits by a doctor.

Paediatrics has been virtually non-existent outside the main hospital, Mulago Hospital. Welfare clinics are in their infancy and there is no distribution of welfare foods, apart from cheap dried skimmed milk at a few centres. The medical budget has been about £1½ million for a population of five millions, which contrasts with almost £700 million for Great Britain with fifty million people—that is, about one-fiftieth.

Problems of Diagnosis

Histories, when obtained through possibly three interpreters, must be approached with caution. Pain in the abdomen, chest, and head are prominent symptoms at all ages. Questions must be leading, and answers often vague, especially as to time. The recognized intervals, days, weeks, and months, deeply impressed on the English mind, become a continuous blur in that of the African, who seldom thinks back more than a few weeks. Ages are rarely known. In the first year the "standard deviation" may be four months, in the first five years it may be two years, and after that it rises progressively.

Pigmentation of the skin is less of a barrier to diagnosis than might be imagined. Most rashes can soon be distinguished, though measles may be difficult at first, and scarlet fever would probably elude the eye. The normal vascularity of the cheeks and hands adds to the depth of colour of the pigmented skin, so that anaemia of any severity can be detected by a lighter muddy tint. For confirmation there are always the conjunctivae, insides of the lips, tongue, and palms. Jaundice is apt to be confused with areas of sub-conjunctival fat which are prominent in the African eye, and cyanosis can be very difficult to recognize, since the best areas for seeing it, the lips, ears, and nails, are slightly pigmented and tend to mask it. A reliable form of oximetry would be very valuable in Africa.

Multiple diagnoses are the rule rather than the exception; a typical "syndrome" might be kwashiorkor, hookworm, malaria, and sickle-cell trait. A number of tropical diseases are encountered and must be recognized, such as onchocerciasis, the protean lesions of leprosy, localized yaws, the "ground-itch" skin lesions of ankylostomiasis, the appearance of scabies when chronically infected, the skull and bone lesions of sickle-cell anaemia, and many others. Consideration of these, however, must not lead to the neglect of the "temperate" diseases, which are largely represented, often in florid form.

Investigations and Treatment

Facilities are few outside the main centres. Whilst many tests, such as the search for malarial parasites, *Treponema recurrentis*, or trypanosomes in the blood, are accurately done, others, such as most biochemical tests, are open to suspicion. Practice in the tropics thus engenders the habit of economy in laboratory requests, of healthy suspicion of the results offered, and of discrimination in what is asked for in a particular hospital. The idea of necropsies is abhorrent to many African minds, and permission for necropsies on children is rarely given. This greatly impedes the advance in medical knowledge in the tropics.

Where there is a shortage of most drugs, the cheapest effective drugs, minimum effective dose, and length of course all have to be considered. Unnecessary multiple therapy is avoided. For out-patient use the great need is for effective one-dose therapy because of the difficulty of follow-up or return visits. Very long-acting penicillins find their main use here in infective conditions, and one dose of 400 mg. of chloroquine base will cure many mild degrees of malarial parasitaemia in the partially immune child.

Intravenous therapy offers special problems of its own, as pyrogen reactions are frequent, and the quantities infused are often vaguely reported. Blood transfusion is the object of much suspicion and superstitious fear, though this is slowly being overcome. Blood is mainly obtained from relatives of transfused persons, from the staffs and students of schools, or from the police. Pyrogen reactions can often

closely resemble an incompatible blood reaction, and the decision to continue or not is often very difficult. The transference of malaria by transfused blood occurs occasionally, but is not a very serious matter. I have also seen a *Staphylococcus albus* septicaemia occur in this way, and other diseases such as syphilis, relapsing fever, trypanosomiasis, filariasis, etc., could be, and probably are, sometimes transferred by fresh blood transfusions.

The Neonates

Labour among the more primitive African tribes is not always as easy as might be supposed. In some Uganda tribes, for example, the women tend to have small pelves; this seems to be a racial characteristic and results in a relatively high proportion of obstructed labour, ruptured uterus, and caesarean sections. There is correspondingly a higher stillbirth rate, though figures are not available. Birth weights are significantly lower than in more advanced countries, particularly among the poorer strata of the population, suggesting that maternal malnutrition may be a factor (Jelliffe, 1952a).

The incidence of prematurity probably differs little from that elsewhere—maternal infections, anaemia, and obstetric abnormalities being important causes. Toxaemia of pregnancy is, however, virtually unknown. Weight for weight the African premature baby seems more vigorous than its European counterpart, and often feeds surprisingly well, even sucking the breast when still well under 4 lb. (1,800 g.).

Neonatal infections occur in both the premature and the full-term infant, particularly pneumonia and umbilical sepsis, though the penicillin-resistant staphylococcus is not in evidence. The incidence is probably related largely to the environmental circumstances. Icterus gravis is extremely rare in Africans, whether due to rhesus or ABO iso-immunization. In South Africans, Zoutendyk (1947) has shown that some 5% of Bantu are rhesus-negative, and it is probable that this figure holds good for Uganda. Other neonatal conditions that are rarely seen are haemorrhagic disease and pyloric stenosis, though it must be admitted that conditions in most tropical clinics are not conducive to the palpation of a pyloric tumour. I have in fact described a typical case in an African child (Luder, 1956).

Infant Feeding

In most tropical regions, breast-feeding is the only available method of rearing infants, and in the vast majority of cases it is successful. Necessity is a powerful stimulus to success. Such breast complications as cracked or inverted nipples are rarely seen, for which the lack of tight brassières is probably to be thanked. Nor is breast engorgement or infection at all common. The milk often comes in at about the third day, by which time the mother is likely to be up and away. It is well known that breast-feeding may be continued for long periods—for example, two years or more—unless interrupted by another pregnancy. The further from civilization the longer the period as a rule. The advantages of prolonged breast-feeding are, firstly, that it provides some protein, however little, to supplement the largely non-protein weaning diet, and, in some areas at least, sexual continence is the rule during lactation, thus forming a natural birth-control method. On the other hand, there is no doubt that the quantity often falls away after the first year (Jelliffe, 1952a), so that the breast then provides little but comfort. It may be actually harmful if it seems to exclude cow's milk, and should then be discouraged. Feeds are, of course, entirely on "demand," a feasible method where the infant accompanies the mother everywhere. In older infants it seems that a "demand habit" can be set up so that short feeds are loudly and frequently cried for, and the result in a hospital ward is often more noise rather than less.

Where breast-feeding is not possible—for example, owing to the death or flight of the mother—the infant's chances

of survival are slender unless another woman can be found to wet-nurse it. There is sometimes prejudice against this, but practice varies. Away from the towns, cow's milk is often not obtainable or is very expensive, and facilities for artificial feeding are very poor; death from marasmus or gastro-enteritis follows. It is remarkable how even a small dose of civilization powerfully affects the incidence and success of breast-feeding. In and near Kampala, where dried milks were advertised and cow's milk could be bought, artificial feeding has become something of a desideratum, and breast-feeding often fails, probably because of the subconscious knowledge that an alternative is available. Artificial feeding is, however, often deplorable, feeds being small, dilute, infrequent, and infected. In these circumstances it is extremely difficult to decide whether it is best to educate mothers more widely in how to carry out artificial feeding properly, thus saving some infant lives, but inevitably striking a further blow at breast-feeding, or to leave mothers in ignorance about artificial feeding in the hope of preventing the decline of breast-feeding.

Malnutrition

Three main types of malnutrition can be distinguished, though there is, of course, considerable overlap. These are marasmus, kwashiorkor, and vitamin deficiencies.

Marasmus.—This may operate from the early weeks of life, mainly in the artificially fed infant who is given a grossly insufficient or dilute feed. It is curious how the bottle-fed baby may only be fed three times a day, while the breast-fed baby may be fed three times in an hour. The result is a total calorie deficiency, giving the well-known picture of gross wasting, absence of subcutaneous fat, alertness, hunger, "starvation" stools, and a great deal of screaming in the early stages. Treatment is often more difficult than would appear at first. Although these babies take feeds avidly, those that have barely exceeded their birth weight by 6 months of age or more, a frequent occurrence, seem to have passed a "point of no return." No matter how large the calorie intake, many will not gain weight significantly, and frequently die, after a long battle, of a secondary infection. Although the stools usually look outwardly normal, further research is clearly needed into possible failure of absorption.

Kwashiorkor (Fig. 1).—This is one of the most widespread nutritional diseases in the world, though it is not at all certain that more children do not die of simple calorie

deficiency, or marasmus. Kwashiorkor is typically seen after about 9 months of age, and in Uganda important factors in the causation are sudden weaning from breast milk on to an almost entirely carbohydrate diet, and maternal deprivation when the child is then "boarded out" with a grandmother. These points are well described by Welbourn (1955). A full description of the condition is provided by Trowell, Davies, and Dean (1954). There is no doubt that certain cases may have marasmic features also, and may be complicated by infections, worm infestations, malaria, etc., which may all be "silent" and easily overlooked. Cancrum oris forms an infrequent but most dangerous complication (Jelliffe, 1952b) (Fig. 2).

A great deal remains to be discovered concerning the eventual prognosis regarding weight and height, relapses, permanent liver damage, degree of pancreatic recovery, cause of sudden death, and many other problems. Blankhart (1953) thinks that kwashiorkor often results in cirrhosis of the liver (Fig. 3), as an end-result of the fatty infiltration in the acute stage. Some of the sudden deaths are due to unsuspected bronchopneumonia, but many remain a mystery. Suprarenal deficiency may explain some. I have seen two cases of collapse in kwashiorkor with low blood pressure, tachycardia, low serum sodium level, and high serum potassium level, which responded to treatment with deoxycortone acetate. It is well recognized that the suprarenals show atrophic changes (Trowell *et al.*, 1954).

Vitamin Deficiencies.—Few overt vitamin deficiencies were seen in Uganda. The commonest was xerophthalmia, which is encountered mainly in the poorest sections of the people, more often in adults and older children. Only three cases of rickets were seen—in children aged 1, 4, and 6 years. The latter two responded rapidly to vitamin-D treatment, and must therefore have been cases of vitamin-D deficiency, presumably of long standing. Scurvy is prevented by the commendable habit of feeding mashed paw-paws to babies from the early months. Much argument has raged over whether the dermatosis of kwashiorkor is pellagrous in type; but in Uganda this seems unlikely, as healing was rapid without extra doses of nicotinic acid.

Malaria

In a hyperendemic zone such as much of Uganda the severest effects of malaria fall upon young children, of whom the great majority have had repeated infections before the first birthday. Since malaria is continuous in hyper-

FIG. 1.—Kwashiorkor showing oedema and severe skin changes.

FIG. 2.—Cancrum oris in a child with kwashiorkor.

FIG. 3.—Cirrhosis of liver with gross ascites.

endemic zones, immunity is not allowed to wane as it does in areas of seasonal incidence, and therefore affords considerable protection in older children and adults, in whom clinical attacks are uncommon and usually mild. Any loss of immunity—for example, through temporary absence—can be serious.

Death in young children is due to cerebral malaria or malarial anaemia. Both are emergencies, as the latter may be rapidly progressive. Cerebral malaria is probably best treated with intramuscular chloroquine (1–2 ml.). Sequelae seem to be extremely uncommon, though long-term studies are naturally lacking. Intramuscular mepacrine, however, is very toxic and may cause death or cerebral damage. In acute malarial anaemia, drug treatment is followed by a further dangerous fall in haemoglobin levels, so that blood transfusion should precede it.

In a hyperendemic zone malaria prophylaxis on a wide scale is fraught with the grave danger that anything short of complete success will make matters much worse by interrupting slowly acquired immunity, and it is difficult to foresee any practicable scheme for the indigenous population in the near future. There may be a case, however, for attempting prophylaxis in children under 2, though the practical difficulties would still be enormous.

Helminth Infestations

Hookworm has a very wide distribution over the tropics and subtropics, and is a major public health problem, albeit a relatively tractable one.

Several interesting problems arise in connexion with hookworm anaemia. Since it is very slow in developing, extremely low haemoglobin levels can be endured—for example, below 20%. There is little doubt that the degree

of anaemia is not proportional to the worm load, and that oedema is out of proportion to the anaemia (Fig. 4). Protein loss in an already albumin-deficient child is presumably a factor. Severe melaena has been seen in a few patients, two of whom had low prothrombin levels, though whether this was a result of chronic liver disease or a possible toxic product of the ankylostoma is not known. Treatment is often very difficult. Blood transfusion may be poorly

FIG. 4.—Severe anaemia and oedema due to hookworm infestation.

tolerated because of the fatty state of the heart, and the value of anthelmintics is limited by their toxicity. The most widely used for ankylostomiasis are still tetrachlorethylene and oil of chenopodium, but the most that can be achieved as a rule is a considerable reduction of the worm load by three or four treatments. I saw several cases of aplastic anaemia which were probably due to these anthelmintics. Clearly the problem is one that must be solved by prevention and not by mass treatment.

Onchocerciasis is another helminthic infection of considerable importance. This disease, caused by *Onchocerca volvulus*, is transmitted by the biting fly *Simulium damnosum*, which does not belie its name. The main effects are skin irritation due to numerous microfilariae in the deeper layers, leading to dryness, wrinkling and atrophy, unsightly

swellings, and blindness. Fortunately, the disease is relatively localized, and progress has been made in eliminating the insect vector.

Other helminths are much less serious. Roundworm can occasionally be responsible for a curious intestinal "toxaemia," with pain, poor appetite, and vomiting. Occasional cases of intestinal obstruction due to a mass of worms are also met with.

Specific Fevers

Of the specific fevers, measles, whooping-cough, diphtheria, mumps, chicken-pox, and smallpox all occur, the first two being extremely common and diphtheria relatively so. One doubtful case of scarlet fever was seen, and this must be very rare. Others, such as rubella and roseola infantum, are probably missed.

The specific fevers present special problems in the tropics. They are often more severe than in temperate zones, with a high incidence of complications, especially bronchopneumonia, a cause of heavy mortality. Isolation facilities barely exist, and only too often cases have to be sent home, to infect others. Whooping-cough immunization would save many lives, though it must be recognized that the endemicity of poliomyelitis would be a danger.

Other Infections

Typhoid.—This is endemic in all areas, and should be thought of first in all cases of "P.U.O." The response to chloramphenicol is extremely good, and I did not see a death out of possibly 25–30 cases. One of these was that of a grossly wasted girl of about 8, found in a hut starving and weighing only 28 lb. (12.7 kg.). Soon after admission her temperature rose and typhoid was confirmed, but she made as rapid and full a recovery as a well-nourished child.

Diarrhoea and Vomiting.—Diarrhoea in the tropics, with or without vomiting, is a somewhat different disease from that seen in temperate areas. It is usually a fairly sudden and short-lived illness, with a much shorter course and fewer sequelae than temperate "infantile gastro-enteritis." In Uganda, at any rate, bacterial causes probably account for half the cases, the commonest organism being *Shigella flexneri*. The atypical *E. coli* is a very uncommon cause (Wilson and Luder, 1957). The presence of pus cells in a fresh stool is a good indication of a lower intestinal infection, and a return to this simple procedure may be valuable even in non-tropical countries. Severe malaria can cause diarrhoea and vomiting, and parenteral infections cause a smaller proportion than in temperate areas. Diarrhoea of all types differs greatly in severity in different tropical countries. Mortality from bacillary dysentery is appreciable in Kenya but very low in Uganda, and much less diarrhoea is seen in kwashiorkor cases in Uganda than in South Africa, Central America, Jamaica, etc. It may be that the cooked banana, which forms the staple diet in Uganda, is "antidiarrhoeal" as compared with maize or rice, and thus resembles the cooked apple, long known for its value in gastro-enteritis.

Meningitis.—The main forms of meningitis seen were influenza and pneumococcal, the former being the commoner. Both types were treated with oral chloramphenicol in large doses—that is, 75 mg./lb./day (165 mg./kg./day) for at least two weeks. This is accepted treatment for the influenza type, but not generally so for the pneumococcal. It was given a trial after disappointing results with intrathecal and intramuscular penicillin and sulphonamides, and the results improved considerably. One child who had been in coma for a week in spite of combined penicillin therapy made a full recovery with chloramphenicol. Thereafter the majority of the cases recovered without sequelae. Meningococcal meningitis is very rare in Uganda, but is commoner in drier parts of Africa.

Congenital Syphilis.—The incidence of this disease has probably been exaggerated in the past. All the cases seen presented with tender swellings of the forearm or lower leg due to osteitis, sometimes with dactylitis of hands and feet

(Fig. 5). The babies were in general well nourished and fit, and the swellings subsided with a short intensive course of penicillin. Follow-up unfortunately was not possible.

Tetanus.—This is seen at all ages, though neonatal cases are fortunately not common. The mortality is still 50–60% in spite of advances in treatment. Prolonged sedation gives disappointing results, as spasms seem to return unless the

FIG. 5.—Dactylitis due to congenital syphilis.

patient is maintained virtually in an unconscious state, which has its own obvious dangers. Some severe cases were treated with intramuscular gallamine triethiodide, with artificial positive-pressure respiration carried out via a tracheotomy, using a cuffed tube, and promising results were obtained.

Poliomyelitis.—Acute poliomyelitis presents a picture in the tropics similar to that seen many years ago in more advanced countries. The main incidence is in infants and young children, in whom the disease occurs in endemic form. Epidemics are rare and small. The mortality is low, though the sum total of paralysis is high and distressing. New-comers to the tropics from countries of high sanitary standards are thus in a peculiarly susceptible state and may contract severe or fatal attacks. As living standards slowly improve, there is a danger that the indigenous populations may go through periods of severe epidemicity, occurring at gradually higher ages, unless the gap can be bridged by widespread immunization.

Mental Deficiency.—It is impossible to give a reliable estimate of the incidence of mental deficiency in Uganda, though in a two-years stay most of the common types were met with, including microcephaly, mongolism, simple primary amnesia, those associated with cerebral palsy, etc. For many reasons mental defect is not a noticeable problem in tropical countries. Many mild degrees are unrecognized, and are compatible with a useful life in an unsophisticated community. Low-grade defectives are kept within the family circle, but probably suffer a heavy mortality in conditions of competition with normal children—for example, for food. Defectives are rarely seen in the few mental hospitals in tropical Africa. It is probable that in some backward tribes

these children are neglected or abandoned. The real problem will come in the future when more of these children survive, tribal community feeling diminishes, and their care becomes a State responsibility, out of limited resources.

Anaemia.—A low haemoglobin is almost universal among the population of all ages. The common causes are well known, and are well described by Trowell (1956).

FIG. 6.—Skull bossing due to sickle-cell anaemia.

These are malaria, helminthiasis, especially hookworm, and malnutrition. In children, sickle-cell anaemia must be considered (Fig. 6), and in certain areas of the tropics schistosomiasis, sprue, and kala-azar are important.

The anaemias of malnutrition include iron-deficiency, nutritional megaloblastic, calorie-deficiency, and protein malnutrition types, of which the last is the most baffling and most resistant to treatment. It is seen in young children with kwashiorkor and in pregnant and lactating mothers when protein requirements may outstrip supply (Woodruff, 1955). It is typically of moderate severity, and the cells are broad and flat, with increased diameters, normal cell volumes, and slightly reduced haemoglobin concentration. There is a moderate reticulocytosis reflecting a hyperactive and slightly megaloblastic bone marrow (Trowell, 1956), but none of the accepted signs of haemolysis are present. There is no response to iron, liver, vitamin B₁₂, folic acid, vitamin C, or other "haematinics," and only a slight rise may occur after months of protein feeding. The effect of blood transfusion is variable. The rise of haemoglobin may be held, but in some cases the level falls again slowly or rapidly. In a few cases the level falls again to its previous low level within one week without any signs of haemolysis, but with some enlargement of the spleen. It seems possible that there is a true "hypersplenism" in these cases, and a syndrome of moderate anaemia of similar haematological type with gross splenomegaly is seen in older children and adults. It is difficult to avoid speculating that in these anaemias there is a deficiency of an unknown factor.

Geographical Paediatrics

A study of the global distribution of disease forms one of the more fascinating and growing by-ways of medicine. In many conditions, especially those forming the classical "tropical diseases," the reasons for this differential distribution are not too obscure. These include those dependent on localized vectors (trypanosomiasis, bilharziasis, malaria); those dependent on different environmental backgrounds (malnutrition, brucellosis, scabies, diseases of heat or cold); and those dependent on genetical differences (haemoglobinopathies, rhesus disease). Even in these groups all is not fully clear; thus malaria does not occur in all the areas where its vectors are to be found, and even if introduced—for example, by immigration—does not necessarily flourish.

It is, however, the great mass of other unexplained observations that provide the greatest interest. Only a few can be mentioned here, apart from those considered earlier. Pathogenic bacteria seem to behave in a somewhat different way in the tropics. One of the commoner staphylococcal lesions is pyomyositis, a condition in which multiple muscle abscesses arise consecutively in any muscle over a period of many weeks, yet no pyaemic metastasis occurs to internal organs. The haemolytic streptococcus, though present, is relatively avirulent. Tonsillitis and rheumatic fever are rare, and acute nephritis is extremely rare. In this connexion it might be added that nephritis in children is almost entirely nephrotic in type, largely due to amyloidosis of the kidney, though not of other organs. The almost universally high gamma-globulin levels due to malaria may explain this. Pneumococcal diseases are acute and severe, and include meningitis, peritonitis, pericarditis, and occasionally osteomyelitis.

Malignant disease in children is much less often seen than in more advanced countries. This can only partly be due to an increased death rate from more acute causes, since the types of malignant disease seen are different. Acute leukaemia was not seen in a Uganda African child, but is seen in Indian children in the same areas, and retinoblastoma seems to be commoner than neuroblastoma. No reticulosos have been diagnosed. The name "Kaposi" indicates, not a varicelliform eruption, but a curious spreading tumour of blood vessels of subcutaneous tissue, eventually becoming highly malignant. In adults these tumours far outnumber tumours of the stomach, colon, rectum, lung, and brain combined.

"Silent" and puzzling cases of heart failure have been ascribed to endomyocardial fibrosis (Ball, Williams, and Davies, 1954), a condition almost confined to tropical Africa. This takes the place of coronary disease as the prime cause of cardiac death in adults, and the aetiology is quite unknown.

The distribution of coeliac disease and fibrocystic disease provides some unsolved puzzles. Coeliac disease is said not to occur in parts of the world where wheat is not a regular item of diet (Sheldon, 1955). In Uganda, however, bread is eaten occasionally in large parts of the country, but one wonders how the disease would be recognized when fat is virtually absent from the diet. Possibly some cases are being missed. The diagnosis of fibrocystic disease is made difficult because the pancreatic enzymes are absent in acute kwashiorkor and slowly return with improvement. One possible case was seen but could not be followed up.

These few scattered examples can only hint at a subject of great importance and interest, the study of which will undoubtedly provide valuable clues to the aetiology of disease, both temperate and tropical.

Summary

An attempt has been made to describe some common and urgent tropical paediatric problems as they were encountered during a two-year attachment to the Uganda Medical Service, together with some of the ethnographical, economic, and human background. Even for this very limited purpose, two years is but a fleeting acquaintance, and there will undoubtedly be omissions and distortions.

Infant mortality is very high and there is a high death rate throughout childhood, the main causes being malnutrition, malaria, respiratory disease, gastro-enteritis, helminthiasis, and sickle-cell anaemia. Medical work is hampered largely by financial stringency, and to a less extent by superstition and suspicion on the part of patients.

The conception of a tropical branch of paediatrics is justified by the different pattern of child life and disease, both temperate and specifically tropical, and the subject has received little prominence in medical teaching, considering the huge child populations of the tropics and subtropics.

A study of the differential geographical distribution of disease will undoubtedly throw much light upon aetiology, and is worthy of greater effort.

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THE NATURAL HISTORY OF POLYARTERITIS*

BY

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In 1952 the Collagen Diseases and Hypersensitivity Panel of the Medical Research Council began a clinical trial of cortisone in polyarteritis nodosa. It was clearly unjustifiable to have concurrent untreated controls, and so some form of retrospective control was necessary. Cases reported in the literature are unsuitable because they are a selected group and are often inadequately followed up. It was thus necessary to collect a new body of data from an unselected and consecutive series of cases studied specially for this purpose. Such a study presented an opportunity not only to learn the prognosis and duration of the disease but also to make a comprehensive survey of its natural history and pathology. Some of the special aspects of this investigation have been reported already (Rose, 1956, 1957; Rose and Spencer, 1957); in the present paper the whole of the results are presented in summary form. The complete report and the case histories are lodged with the Medical Research Council, from whom a copy may be borrowed on request.

The survey was based on all histologically proved cases of polyarteritis under care at nine teaching centres during the period 1946 to mid-1953; 111 cases were obtained. Of these, 90 were located from diagnostic indices, and the remaining 21 by a search of all the necropsy reports (and sometimes the sections also) for the period in question. In any possible cases of polyarteritis all the available sections were studied by one or other member of the panel of pathologists set up for this purpose by the Medical Research Council.‡ Doubtful cases were seen by the whole panel. Full reports were provided on all approved cases, and these form the basis of the histological analysis in the present report. The panel did not, however, take responsibility for the analysis.

There was evidence that the number of cases diagnosed was tending to increase during the period of the survey, particularly among the elderly. This may well have represented a true increase in the incidence of the disease; but the limitations of a retrospective survey prevent any firm conclusions. Unfortunately no trend was apparent towards either earlier diagnosis or more frequent ante-mortem diagnosis.

Classification

In a preliminary survey of data it appeared that some classification might usefully be based on the presence or absence of pulmonary involvement. Unfortunately adequate histological material from the lungs was not always available, and the assignment of patients to one or other group was therefore based in addition on other features which were

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