between the administration of a fresh course of steroid therapy and the onset of the steatorrhœa. In case 1, the larvæ had been noted in the stool 5 months before but did not seem, at the time, to be causing symptoms. Absolute proof is not possible but we conclude that the malabsorption in these patients was caused by a change in the host-parasite relationship in favour of the parasite, induced by the steroid therapy. This complication has not been observed in the large number of cases of nephrotic syndrome treated at this hospital without steroid therapy and we have not been able to find reference to such a finding elsewhere. Although strongyloides is a common parasite in this area, with an incidence in stools varying from 3·3% in hospital patients (Cowper and Woodward 1961) to 21% in a village near Ibadan (Gilles 1964), only an occasional case of malabsorption associated with it seems to have been recognised locally. The experience of Bras et al. (1964) in Jamaica suggest that such cases may be more common than has been recognised.

Such a disturbance of host-parasite relationship is not unexpected after the use of steroids. The pathogenicity of a wide variety of infective agents is increased by steroid therapy. This effect is not limited to bacteria but has been reported in infections by a fungus, *Candida albicans*, and a yeast, *Histoplasma capsulatum* (Smith and Cleve 1957). This effect is also well recognised in amœbiasis (Eisert et al. 1959). Exacerbation of helminthic infections by steroid therapy does not seem to have been reported but there seems no reason why this should not happen. The means whereby the balance between the host and parasite is maintained remain obscure. They may include antibodies against the parasite formed by the host and antibodies against *St. stercoralis* have been demonstrated (Brannon and Faust 1949). Their depression by steroid therapy provides a possible mechanism whereby the invasiveness of the parasite might be increased. There are two ways in which the balance could be upset. Local resistance in the intestinal mucosa to the adult females might be reduced causing them to become more locally invasive. de Paola (1961) mentions encapsulation of the adult females as being an important defense mechanism. The other possibility is that steroid therapy might induce a phase of internal autoinfection. In this form of the life-cycle the rhabditiform larvæ change to the filariform type in the gut lumen and pass via the gut wall and the local lymphatics to the blood-stream. They complete the life-cycle by travelling to the lungs and enter the gut as adults after ascending the trachea. If considerable, this process will clearly lead to a very rapid increase in the intensity of the gut infection. We consider it possible that such an episode of autoinfection was occurring in these cases since this would most easily explain the severity of the infection. Some support for this view is provided by other workers. Of 11 cases, in which intestinal symptoms were prominent, and which reached necropsy (Kyle et al. 1948, Brown and Perna 1958, Stemmermann and Nakasone 1960, Dias 1960, Bras et al. 1964, Wilson and Thompson 1964) 10 showed microscopic evidence of internal autoinfection. In one case (Dias 1960), the information is too limited for comment.

It seems that steroid therapy may in some patients with *St. stercoralis* infestation cause the parasite to become a dangerous pathogen. This has more than local significance for due to its capacity for internal autoinfection the parasite may persist for many years. In one case (Brown and Perna 1958) 36 years elapsed between contact and diagnosis. It follows that in countries where the use of steroid therapy is widespread patients may be seen who have not been in an area where the parasite is endemic for some years and who have never had symptoms but in whom the steroid therapy causes severe symptoms. Failure to recognise this may lead to a serious delay in treatment. The danger in endemic areas is obvious. Diagnosis is best made by finding the larvæ in the stool or by jejunal aspirate, bearing in mind that in some cases repeated stool examination may be negative when the larvæ are easily demonstrated in the jejunal fluid (Jones 1950). Dithiazinine and thiabendazole provide effective therapy. The unfortunate experience of Stemmermann and Nakasone (1960) with the former drug when massive absorption resulted in death may indicate that thiabendazole should be the first choice in patients with steatorrhœa.

Summary

Two patients with nephrotic syndrome developed malabsorption due to strongyloidiasis after the administration of steroid therapy. It is suggested that steroid therapy increases the pathogenicity of this parasite and that strongyloidiasis should be born in mind as a possible complication of treatment with corticosteroids.

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PREVALENCE OF HALLUX VALGUS IN A NEOLITHIC NEW GUINEA POPULATION

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HALLUX VALGUS is a deformity with a wide distribution. In St. Helena, Shine (1965) showed that, especially in women, the main cause was the wearing of shoes; hallux valgus was present in 2% of those who were habitually barefoot, although in this group no sex difference was observed.

The findings described here were made in June, 1964, during a study of scarring and ulceration of the legs. Hallux valgus was looked for in all villages in the Tekin valley, except in Duanmin. The area is in New Guinea near the border with Papua and West Irian. Local Australian administration had been present in the area for only three years, and two censuses had been con-

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ducted in which names were recorded in village books. In one village I took genealogies from the adults who had attended and found that few persons, mainly the very old and those unable to walk because of disease, had been missed by previous censuses. About 90% of the census-population were seen; the absentees were young men who were carrying equipment for an exploratory patrol, menstruating women, and a few families working in gardens in distant valleys.

The people live in a valley 5000–6000 ft. above sea level. The dress of the men is unusual and consists mainly of long gourds worn as phallocrypts. Stone axes are still in use for felling timber but are being rapidly replaced by steel. Limestone outcrops are common, but most of the paths are through former gardens and are muddy and overgrown with vegetation. No kind of footwear is worn.

Methods

Except for infants, all persons were seen standing. The presence or absence of hallux valgus was assessed clinically, and the side affected and the severity were recorded. Severity was assessed as slight, moderate or severe for each foot and photographs were taken of 7 persons (with 11 affected feet).

TABLE I—AGE-DISTRIBUTION AND SEX-DISTRIBUTION OF HALLUX VALGUS IN TEKIN VALLEY, NEW GUINEA, 1964

Age-group (yr.)	Male		Female		Male and Female	
	No. examined	No. with hallux valgus	No. examined	No. with hallux valgus	No. examined	No. with hallux valgus
0–9	213	0 ..	140	0 ..	353	0 ..
10–19	142	0 ..	166	6 (4%)	308	6 (1%)
20–29	93	0 ..	117	1 (1%)	210	1 (0·5%)
30–39	91	4 (4%)	77	4 (5%)	168	8 (5%)
40–49	64	2 (3%)	61	9 (15%)	125	11 (9%)
50–59	42	0 ..	25	1 (4%)	67	1 (2%)
60+	20	1 (5%)	5	0 ..	25	1 (4%)
All ages	665	7 (1%)	591	21 (4%)	1256	28 (2%)

To allow comparison with other studies, these photographs were projected, and the hallux angles were measured with a protractor. Slight hallux deformity corresponds to a hallux deviation of approximately 15° and moderate to 20°. Those judged as severe had angles of 21°, 24°, 27°, 28°, 30°, 32°, 34°, and 42°. The accompanying figure shows the feet of two women. The woman on the left was aged about fifty-one years and was assessed as "bilateral severe". Her thirteen-year old daughter on the right has a moderate hallux valgus in the left foot and a normal right foot.

The results were analysed in terms of age; sex; presence of hallux valgus in either foot; number of feet affected; and severity. A score was calculated for severity with "slight", 1 point; "moderate", 2; and "severe", 3, for each foot affected. (For any individual person the maximum possible score was 6.)

TABLE II—NO. OF FEET WITH HALLUX VALGUS, TOTAL SEVERITY SCORE, AND MEAN SCORE PER AFFECTED FOOT, BY AGE AND SEX, TEKIN VALLEY, 1964

Age-group (yr.)	Male				Female			
	No. examined	No. feet with hallux valgus	Total score	Mean score	No. examined	No. feet with hallux valgus	Total score	Mean score
0–9	213	0	0	0	140	0	0	0
10–19	142	0	0	0	166	9	22	2·4
20–29	93	0	0	0	117	2	4	2·0
30–39	91	5	7	1·4	77	6	17	2·8
40–49	64	3	7	2·3	61	13	39	3·0
50–59	42	0	0	0	25	2	6	3·0
60–	20	2	6	3·0	5	0	0	0
All ages	665	10	20	2·0	591	32	88	2·75

Hallux valgus in 51-year-old woman, and her 13-year-old daughter. Tekin valley.

People were seen in family groups, and age was estimated by the physical appearance, the number of children or number of younger siblings present. Generally no questions were asked about age.

Results

Table I summarises the prevalence of all grades of hallux valgus by age and sex: it is more prevalent in those over thirty years than in those under thirty and commoner in females than in males. This is also evident in table II, which gives the number of affected feet. In males there were 6 left and 4 right feet affected, whereas in females there were 17 left and 15 right affected. Table II also gives scores of severity by age and sex. It appears that the deformity is more severe in females, and that severity increases with age in both sexes.

It was possible to question affected persons about the family history in only one village: 3 women with bilateral severe hallux valgus all had mothers with bilateral hallux valgus (including one of the women seen); 1 woman with severe deformity in the right foot and slight in the left did not know; and 1 woman with unilateral moderate deformity (right foot) had a mother who had no hallux valgus. No histories were taken in the village of the women whose feet are shown in the figure.

Discussion

The results differ from those reported from other areas. Severe deformity was relatively common in unshod people, and there was a sex difference. Possibly severe hallux valgus has a different ætiology from lesser forms associated with increasing age and shoe-wearing. Although many of the habitually barefoot Nigerians seen by Barnicot and Hardy (1955) had some valgus deviation, very few had a deviation greater than 20°. Kalcev (1963) classified all deviations greater than 9° as hallux valgus, and found a progressive increase with age. From his frequency-distributions, severe hallux valgus seems commoner with increasing age, although the mean angle increased only 2° through the ages ten to forty-one years.

Sandelin (1923) noted a hereditary influence in 54% of 536 patients who needed operation; no data were obtainable in 23% of the remainder. Hallux valgus may have a variety of causes—genetic, the wearing of shoes, and the general wear and tear associated with walking. The Tekin valley population appears to provide evidence for two of these. There was little difference in side affected, which makes it unlikely that some factor such as pressure of the foot against a digging stick is important. Hallux valgus, although looked for, was very uncommon near Maprik in the Sepik lowlands of New Guinea; this

could be due to genetic differences, since there are apparently no significant environmental differences in terms of wear and tear. The occurrence of severe deformity in young women and the evidence of family history suggests that sex is an important factor. In St. Helena, Shine (1965) noted that women who wore shoes had a much greater mean angle than men, and although mean angle did not differ in the barefooted, the sexes in this group were not compared in terms of severity.

For future population studies not only mean angles but also severity of deformity and family history should be taken into account.

Summary

The prevalence of hallux valgus in 1256 persons of all ages in a neolithic New Guinea highland population increased with age. The deformity seemed commoner and more severe in women.

The population was visited with the assistance of Mr. R. Cole, District Commissioner, Wewak, and the results are published with the permission of Dr. R. F. R. Scragg, Director of Public Health, Papua and New Guinea.

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CLINICAL RECOGNITION OF HYPOXÆMIA UNDER FLUORESCENT LAMPS

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Stadie (1919) was the first to demonstrate the relationship between cyanosis and arterial hypoxæmia. Since that time convenient instrumental methods for measuring oxygenation—such as cutaneous oximetry and the analysis of arterial (or arterialised) blood-samples—have been developed. These techniques are not yet available in many centres, however, and, at present, the diagnosis of hypoxæmia is almost invariably made by observation of the patient's appearance.

Comroe and Botelho (1947) and Medd et al. (1959) investigated the nature of the quantitative relationship between cyanosis and arterial oxygenation, but these studies were made before the general introduction of fluorescent lighting in hospitals; and Crul (1964) has stressed the importance of using lamps with suitable spectral-energy distributions for the detection of cyanosis. The Medical Research Council (1965) has recommended the lighting considered most suitable for the detection of cyanosis. But there has been no attempt to assess the rival merits of different fluorescent lamps by means of a direct comparison of clinical impressions of cyanosis and biochemical indices of hypoxæmia in simultaneously sampled arterial blood. We have carried out such a study using six different fluorescent lamps, one of which accorded fairly closely with the recommendations of the Medical Research Council. We have also taken the opportunity to compare the validity of assessments of cyanosis made in different sites of the body. The patients studied were all breathing air during recovery from anæsthesia when a mild degree of hypoxæmia is usual (Nunn and Payne 1962).

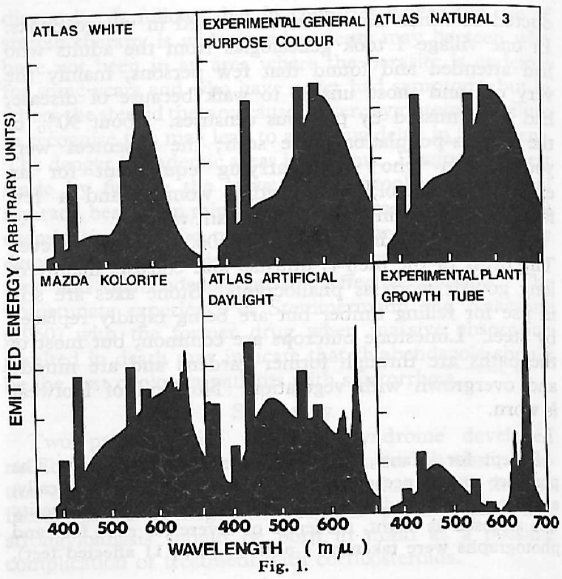

Fig. 1.

Method

The 50 patients used in the investigation were randomly selected from amongst those undergoing surgery in the General Infirmary at Leeds. Their ages ranged from 21 to 91 years. Patients with striking skin pigmentation were excluded. Although no patient had obvious hypovolæmia or circulatory depression, no attempt was made to exclude any patient on the grounds of circulatory stasis. The measurements were made during the postoperative period before recovery of consciousness, so that changes of arterial saturation due to irregular breathing were avoided. A fully patent airway was maintained at all times. The patients' oxygen saturations ranged from 87·5 to 97·0%.

Six fluorescent tubes were investigated: Atlas 'White' (3400°K); Experimental general-purpose colour (3800°K); Atlas 'Natural 3' (3900°K); Mazda 'Kolor-rite' (4100°K); Atlas 'Artificial Daylight' (6500°K); and an experimental plant growth tube. The correlated colour temperature (where applicable) is given in parentheses. The spectral energy distributions of the six tubes is shown in fig. 1. There is at present no universally adopted policy concerning the choice of fluorescent lamps for use in hospitals, and tubes seem to be selected almost at random from amongst the range available.

The tubes were arranged in a portable gantry which could be pushed over the patient, and daylight was excluded by black curtains around the sides. The curtains were lined with white material so as to avoid serious alterations in the spectral quality of the reflected light. The lamps were switched on in random order using a table of random numbers (*Documenta Geigy*), so that none of the observers knew which lamp was on at any given time. The filaments of the tubes were heated at all times so that full spectral emission was reached immediately they were switched on. The average intensity of illumination of the patient was 49 lumens per sq. ft.

Three observers were asked to inspect the patient under each of the six lights, and to assess the degree of cyanosis in each of five body sites—lips, buccal mucosa, ear lobes, conjunctivæ, and nail beds. The degree of cyanosis was arbitrarily graded according to the scale: no cyanosis (0); slight or indefinite cyanosis (1); moderate cyanosis (2); or severe cyanosis (3). The observers were doctors or State-registered nurses, and had normal colour vision as checked by the Ishihara test. The mean degree of cyanosis at each site and under each lamp was