RINGWORM OF THE SCALP IN THE EASTERN REGION OF SCOTLAND, 1946-7

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The main object of this paper is to present a picture of ringworm of the scalp in the Eastern Region of Scotland (counties of Angus and Perth) from July 1, 1946, to the end of 1947. During this period there were two epidemics of small-spore ringworm and 631 cases were seen. Owing mostly to lack of appreciation of the factors involved, misleading or doubtful statements are still being made about ringworm of the scalp, and the opportunity is here taken to make categorical statements when these appear justified. Some experiments with local treatment are described.

The great majority of cases of ringworm of the scalp in this country are due to microsporon infection, but as one travels south through Europe the proportion changes till in Italy nearly all cases are due to the trichophyton (Walker and Percival, 1939). Recent reports confirm this statement. Keddie (1947) found in an epidemic of scalp ringworm in Bathgate, Scotland, that all the 351 children were infected by microsporon. Chmel (1946), in analysing results of cultures from 156 cases of ringworm, not confined to scalp cases, in Czechoslovakia from 1942 to 1946, found that microsporon was responsible for 40% (he states that the number is still increasing), *Trichophyton endothrix* 22.4%, *T. ectothrix* 26.9%, *achorion* 2.56%, and *epidermophyton* 8.14%. Catanei (1947) states that out of 871 cases of ringworm in school-children in Algiers examined in 20 years 4.5% were due to microsporon (*M. canis* more often than *M. audouini*), 9.5% were favus, and the remaining 86% *T. endothrix* infections.

In the U.S.A., reports of several epidemics have recently been published showing an overwhelming preponderance of microsporon infection of the scalp. Schwartz *et al.* (1946) found *M. audouini* in all but 8 cases out of 565 in Haverstown, Maryland, during 1944-5. Lewis *et al.* (1946) saw in the New York Hospital 312 patients with tinea capitis from July 1, 1943, to June 30, 1945; 305 were microsporon infections (*M. audouini* 275, *M. lanosum* 30), 5 were due to *T. endothrix*, and 2 to *achorion*. Over 28 months to May, 1945, out of 928 cases in the Vanderbilt Clinic Miller *et al.* (1946) found 96.9% due to *M. audouini*, 2.6% due to *M. felineum* (*M. lanosum*), and only 0.5% due to other organisms.

With regard to the type of microsporon found in this country, Duncan (1945) states that *M. audouini* seems to be the predominant species causing tinea capitis in the Midlands and North, while the animal types were common in school-children in the southern counties and in the London area. In the latter area the two types of microsporon were found in approximately equal numbers.

Favus was formerly common in Scotland. McCall Anderson (1871) found it in 1.56% of 10,000 consecutive dispensary cases in Glasgow. Norman Walker (1899) stated that the opportunities of studying favus were numerous in Scotland. As will be seen, it is now rare in the part of Scotland under consideration, though cases continue to crop up occasionally.

Two Epidemics of Ringworm

Fig. 1 shows the occurrence of ringworm of the scalp as seen in the ringworm clinic of Dundee Education Authority from its inception in 1914 to the outbreak of

the last war. It will be seen that the infection had almost disappeared from this area by September, 1939. Its recrudescence is simply explained by war conditions: mass movement of children in evacuation schemes and consequent relaxation of supervision by parents and school medical staffs allowed an endemic condition to become epidemic.

FIG. 1.—Incidence of scalp ringworm in Dundee from 1914 to 1939.

In this region there have been two recent major epidemics of ringworm of the scalp—one in Dundee (population 180,000), which first appeared in 1944, and one in Arbroath (population 18,000), some fifteen miles away, in which cases were first noted in the middle of 1946. Fig. 2 shows the progress of these epidemics.

FIG. 2.—Progress of epidemics in Dundee and Arbroath (1946-7).

Before the return of one of us (J. K.) from war service considerable difficulty was experienced in dealing with the Dundee epidemic. Adequate facilities for x-ray epilation were not available and thallium had been procurable only in inadequate quantities when it had been available at all. From the middle of June, 1946, however, the epidemic could be tackled satisfactorily, and when asked to deal

with the subsequent epidemic in Arbroath we were able to arrange at once for the requisite organization and facilities.

From July 1, 1946, to the end of 1947 Dundee produced 217 cases, in Arbroath there were 381, while from other parts of the region we received 33—a grand total of 631 cases.

Mycology

Owing to scarcity of Sabouraud's original medium and the difficulty of classification with any modification, not all the cases were examined culturally. By random culture from cases considered typical of infection by *M. audouini* and routine investigation of all the rest we were able to satisfy ourselves that any error in clinical diagnosis put the more inflamed audouini infections among the animal ringworms, never the reverse.

TABLE I.—Type of Infection

	Micro- sporon		T. endothrix			T. ectothrix (Clinical)	Ach. schön.	Total
	Aud.	Lan.	Crater	Sulphur	(Clinical)			
Dundee ..	202	8	5	1	1	—	—	217
Arbroath ..	381	—	—	—	—	—	—	381
Rest of region	30	—	—	—	—	1	2	33
Total ..	613	8	5	1	1	1	2	631

Table I shows the types of infection found and the very great preponderance of *M. audouini* infections—97.1%. In all, 98.4% were microsporon infections.

In Dundee 183 cases were in boys and 34 in girls; in Arbroath the figures were 322 and 59 respectively; while from the rest of the region there were 26 boys and 7 girls. This gives a proportion of 84.15% boys and 15.85% girls affected. Keddie (1947) found 89% boys affected and 11% girls out of 381 cases; Schwartz *et al.* (1946) give 84.4% boys and 15.6% girls among their 565 cases, so that the figures from this country and from the U.S.A. for similar epidemics are almost exactly the same. Fig. 3 shows the age and sex incidence in the Dundee and Arbroath epidemics.

FIG. 3.—Age and sex incidence in combined epidemics. Not shown in the Graph are ages 0-5 years: boys 72, girls 33, total 105 cases.

The marked prevalence of the infection in boys in the "clipper area"—that is, the area so dealt with in barbers' shops—had been commented on by Schwartz *et al.* (1946). They found 65% of boys were affected in this area alone, 31% in the clipper area and elsewhere, and 4% on the crown. In girls the commonest site was the parting of the

hair. Table II shows the site of the primary lesion in the Dundee and Arbroath epidemics. In the case of the disseminated infections it was impossible to ascertain accurately where the disease started, but the clipper area was always included. The cases affecting the eyebrows were interesting. Here typical lesions of *M. audouini* infection of the glabrous skin were seen, including in their orbit parts of the eyebrows. Examination under Wood's light showed the typical fluorescence of the eyebrow hairs within the infected areas. Lesions of the hair margin showed fluorescence of the lanugo hairs as well as of the scalp hairs within the lesion.

TABLE II.—Site of Original Lesions, Dundee and Arbroath Epidemics

	Boys	Girls
Occipital region ..	56%	32%
Parietal region ..	9%	17%
Vertex ..	4%	16%
Frontal region ..	2%	6%
Hair margin ..	4%	6%
Disseminated ..	25%	21%
Eyebrow only ..	1 case	2 cases

In boys the most prominent part of the occiput was the one most frequently involved. This led one to incriminate as the source of spread something with which this part in particular came in contact, such as the back of cinema seats, but no definite proof could be obtained that they were at fault. Barbers' shops are a more likely source of spread. Few barbers sterilize the tools of their trade between customers, and scissors, clippers, combs, and brushes can easily pick up infected particles of hair and pass them on to other scalps. Girls are not so exposed to this risk, and their long hair affords a considerable degree of protection from infection. This is shown by the fact that the more easily accessible portions of the scalp about the parting of the hair are most often involved, as Schwartz remarks.

Organization

To control ringworm infection it is essential that efficient organization and liaison exist. Any case of ringworm of the scalp should be notified to the school medical officer concerned so that all possible contacts can be examined by Wood's light and missed cases discovered. By this means other epidemics have been nipped in the bud, and by the end of the period under review ringworm seems to be well under control throughout the whole of the region. For instance, in one small town a game of blind-man's-buff resulted in four girls developing ringworm in the area which had been in contact with the handkerchief. The source of infection was known and further spread was prevented. A pupil in a private girls' school was found to have ringworm. She had recently returned from India, where she had had ringworm but had been pronounced cured by her doctor. On being informed the school medical officer visited the school by arrangement and examined all the girls under Wood's light. Three other girls were found to be infected, but though this examination has been repeated there have been no further cases. A boy in hospital suffering from paralysis following anterior poliomyelitis was observed to be infected. He had passed the disease on to two other boys in the ward, but his history showed that he had had the infection before admission. The school medical authorities visited his home town and found among his class at school three other cases.

School medical authorities should have a portable source of Wood's light and a staff trained in its use. The immediate examination of all possible contacts, treatment of any case found, and repetition of the examination made till a period of at least three months has elapsed since the last case was discovered will ensure extermination of the outbreak.

For the investigation of children under school age one has to depend on the co-operation of the parents, but they

are as a rule very willing to have their children examined. The demonstration of a vividly fluorescing head creates a very strong impression on parents.

For treatment accommodation provided with Wood's light and a trained staff is essential. Cases were seen by us weekly, but manual epilation where required was done by the nursing staff. They soon grew very proficient in the detection of infected hairs and in their removal. Skilled fingers will remove many an infected hair which would break off under less adept hands.

Recording must be carefully done not only to provide a record of treatment but to keep a check on attendance so that absentees can be rounded up. Although attendance of patients was on the whole satisfactory, carelessness had to be checked and absentees induced to return by visits to their homes to explain the necessity for regular attendance not only for the child's sake but for that of others who might be infected by him.

The running of the clinics was under our supervision, for it is very necessary that a trained dermatologist should oversee the treatment. Ringworm of the scalp varies so much in its manifestations that the many problems that crop up can be solved only by one experienced in dealing with ringworm.

No child was allowed to return to school until given permission by the dermatologist. Without the use of Wood's light it is impossible to be certain that all infection by microsporon has gone. Many cases have been seen in which clinically no evidence of infection remained and yet under Wood's light the tell-tale fluorescence showed that the disease was still present. It should be stressed to all general practitioners that this is the only certain method of assessing cure and preventing children still infected being allowed back at school.

Clinical Varieties of Scalp Ringworm and Their Diagnosis

The various types of ringworm must be considered separately; they present different problems in diagnosis and require different forms of treatment.

Small-spore Ringworm.—All cases of this infection showed characteristic fluorescence under Wood's light. This appears to be common to hairs affected by different species of microsporon, but, in addition, by this means information can be obtained about the age and state of the infection.

M. audouini.—Recent infection showed well-defined circular areas within which the hairs fluoresced bright green. Sometimes the hairs at the margin were more evident than those at the centre; they had not been broken off so short. In such cases total epilation by x rays or by thallium is the most rapid and certain means of cure. The infection is virulent and likely to spread. In older infections the patches are not so well defined and the fluorescence may not be so vivid—whitish rather than green. There is often a more pronounced scaly reaction of the skin than in new infections and there is not the same tendency to spread; the fungus appears to have lost some of its virulence and is more amenable to treatment by local epilation by x rays or even to local application of a fungicide and manual epilation. The hairs are not so brittle as in a recent infection and can often be epilated whole.

Occasionally, especially after thallium epilation, a few hairs remained infected in an attenuated form. These hairs may be of normal length and show an interrupted fluorescence giving rise to a beaded appearance under Wood's light. It was usually possible to epilate such hairs completely. If a hair broke below the surface of the scalp a scale was apt to grow over the follicular orifice and hide the stump. Consequently there was no green fluorescence under Wood's light till the scale had been removed, when the vivid green of the growing stump became visible. Any scale must be removed and the underlying scalp inspected before one can be certain of cure.

Sometimes a case of *M. audouini* infection showed a kerion reaction. If one lesion became affected, all did. These cases were apt to be mistaken for animal microsporon infections, but culture showed the characteristics of *M. audouini*. The development of kerion in these cases is spontaneous and not affected by any form of treatment used. It may be active enough to cause spontaneous fall of the affected hairs and consequent cure, but is less likely to do so than in the case of infection by *M. lanosum*. Out of the 381 Arbroath cases 24 showed this kerion formation—15 were cured by local measures and 9 required x-ray epilation.

M. lanosum.—At first this infection is clinically indistinguishable from that due to *M. audouini*, but in all cases seen a follicular inflammatory reaction occurred, probably at least a fortnight after the first appearance of symptoms, leading to mild kerion formation, usually with defluvium of the patches and cure. This could be helped by manual epilation of the affected hairs under Wood's light. Sometimes these cases were given x rays before the onset of kerion; this seemed to have little influence on its progress. The kerion did not seem to be made worse by x-ray treatment.

The degree of kerion produced by microsporon infections is much less than by *T. ectothrix*, and no sequelae such as permanent loss of hair or scarring were noted. The appearance of this reaction is therefore beneficial, and it is regrettable that so far no satisfactory method of producing it artificially has been devised.

T. ectothrix.—In view of the small number of cases seen there is little to say about this infection. Careful examination under Wood's light failed to show any fluorescence of the affected hairs. No case resembling a condition which could be called "black dot ringworm" was seen. The clinical appearance in all cases was an irregular area showing loss of hair with some scaliness and with broken hairs scattered between those of normal length. Scrapings from the affected area examined in liquor potassae under the microscope revealed among the scales fragments of hair containing the typical chains of squared spores. Local epilation of the affected areas by x rays was sufficient to cure the condition.

T. ectothrix.—Only one case is included in this series. Owing to the length of time the disease had existed no affected hairs remained and culture from pus and crusts was negative. The kerion was typical of this type of infection, a well-defined, swollen, inflamed area oozing pus from dilated follicular openings. The child came from a farm where cattle were infected with ringworm. During the period under review we have seen only one case of ectothrix kerion in which affected hairs remained, and on careful examination under Wood's light no fluorescence of the hairs was noted. In this case *T. gypseum asteroides* was the fungus responsible. Fortunately Wood's light is not essential for the management of such cases: the clinical picture is adequate guide for diagnosis and estimate of cure.

Favus.—The two cases in this series were in brother and sister who lived in the country. The disease had existed for over a year and had been diagnosed as seborrhoeic. The mother had been conscientious in her treatment, which consisted in regular washing and application of ointment; consequently no scutula were seen and there was little alopecia. The picture was of well-defined patches of inflammation of the scalp, especially round the follicles. The scalp in the affected areas was red and rather scaly; there was slight patchy cicatricial alopecia, but no broken hairs were seen. The margins of these areas were sharply defined. Favus was suspected on account of the above characteristics and the occurrence in two members of the same family. There was also a distinct mousy odour about the scalps. Under Wood's light the diagnosis was easily confirmed, and the extent of the infection was found to be much greater than had appeared at first sight. There were numerous unsuspected small areas of infection. Achlorion infection can readily be distinguished from microsporon infection under this light. The fluorescence is a dusty green, quite different from the brilliant green fluorescence of microsporon-infected hairs. A still more distinctive characteristic is that the hairs are not broken off short but are more or less of normal length. The combination of long dusty-green fluorescing hairs on a scalp inflamed and red in colour, showing alopecia with

scarring occurring in well-defined patches, is pathognomonic of favus and enables a diagnosis to be made even in the absence of scutula. "Chronic impetigo" of the scalp, the lesions remaining in the same situation for more than a few weeks, should always lead to a suspicion of favus.

It may be mentioned that during the period under review two cases of favus of the glabrous skin were seen; both showed typical scutula. One of these patients, a boy, had lesions on his abdomen; the other, an adult female, was affected on the left upper arm. In the latter case *A. quinckeanum* was the responsible fungus.

Treatment

Epilation by x rays or thallium was employed in all cases of microsporon infection except (a) cases showing kerion formation, in which local treatment was given a chance first—and only if there was likelihood of insufficient spontaneous epilation were other means used; (b) those with attenuated old infection—in these cases also local applications and manual epilation were used; and (c) children under 2 years old, because it was not thought desirable to use thallium at such an early age, and because, the hair follicles being relatively shallow in young children, the disease is more amenable to local treatment. It was found, however, that at best these cases took longer to cure than those which were epilated by thallium or by x rays.

In all, 93 cases were cured without x-ray or thallium epilation—a percentage of 14.74. Lewis *et al.* (1946) state that there is a tendency to spontaneous recovery in approximately 10% of patients. The remainder underwent x-ray or thallium epilation. All children under 7 years of age who were unlikely to remain still enough for satisfactory x-ray treatment received thallium. Beyond transient and mild symptoms there were no bad effects from this drug. Strict precautions were taken for its administration; weighing was done by a nurse and checked independently by a doctor, who wrote out the prescription for the dose, using Ingram's method to calculate the amount required—i.e., multiplying the weight in pounds by four to get the dose in milligrams. The dose was made up in orange squash and given to the child and drunk in the nurse's presence. No difficulty was experienced in inducing the child to take the dose in this way. It was not regarded as "medicine."

In view of the large numbers to be dealt with, x-ray epilation of local patches was used in selected cases to save time. At first all the cases so chosen were probably not suitable, and the treatment had to be extended in some cases as the disease had spread. Later more careful selection made this method more successful.

Thallium epilation is not so complete as that following x rays, and considerable trouble was experienced when all the affected hairs did not fall out. Treatment had then to be continued by manual epilation, and in some cases thallium had to be repeated or x rays used to obtain a cure. Six months were allowed to elapse before thallium was repeated, and no bad effects were encountered; in fact, some children showed more reaction after the first dose of thallium than after the second. Details of treatment are given in Table III.

TABLE III.—Treatment (in Addition to Manual Epilation)

Ointments only ..	93	Total x rays repeated ..	2
Local x rays ..	197	Thallium ..	77
Local x rays repeated ..	10	Thallium repeated ..	6
Local then total x rays ..	25	Thallium, then x rays ..	16
Total x rays ..	203	Refused all treatment ..	2

Ointments were used in preference to liquid applications. Their greasy nature makes infected particles less likely to fly about and infect others. Iodine was not used; it coats the hairs so that they appear jet-black under Wood's light and all fluorescence is obscured. Whitfield's ointment was employed as a routine, but if kerion was present it was

replaced by 1% ammoniated mercury in petroleum jelly. Through the kindness of I.C.I. (Pharmaceuticals), Ltd., a supply of salicylanilide ointment as recommended by Schwartz (1946) was obtained. The formula used was:

Salicylanilide ..	..	4.5
"Cetavlon" ..	..	1
Carbo-wax 1500 ..	..	to 100

In addition salicylanilide in "eucerin" base and in alcohol were used, and latterly sodium salicylanilide.

Parents were instructed to apply the ointment to the whole scalp daily, to wash it twice weekly, and to keep it covered with a cotton cap. When the hair began to fall it was to be assisted by daily pulling out the loose hair with the object of completing the epilation as rapidly as possible. Patients attended the clinic weekly during this period so that the epilation could be supervised. This is extremely important, as parents varied in their efforts to extract the loose hairs.

Schwartz (1946) found it difficult to show statistically the advantage of salicylanilide in carbo-wax over other applications, but it was undoubtedly present, though we find ourselves in the same position. Those who had to deal with the epilation of the hair in the various clinics were unanimous in their opinion that it was the only application which seemed definitely to assist in cure. Under its influence hairs were more easily epilated and more likely to come out whole than with other ointments. The greater penetrative power of the carbo-wax was apparently the important factor, as salicylanilide in eucerin base was no more effective than other ointments, and salicylanilide in alcohol was found to give a similar result. Sodium salicylanilide was disappointing and less effective than salicylanilide.

It is important to remove any ointment before examination under Wood's light, as vaseline fluorescence obscures that of ringworm. Carbo-wax is non-fluorescent, but sodium salicylanilide, unlike salicylanilide, fluoresces blue, not unlike vaseline. It was found that by passing the light through a lens not only was its intensity increased but much of the vaseline fluorescence was removed without altering the fluorescence of the affected hairs. Lenses were used both in this way and to examine the scalp to facilitate the identification and removal of faintly fluorescing hairs and short stumps.

Four weeks after x-ray or thallium administration the scalp was normally clear of infected hairs and the child was allowed to return to school. Supervision was continued for a further six weeks, and the child was re-examined in a fortnight and again in four weeks. Occasionally an odd fluorescent hair was detected at these examinations; this was usually easy to remove completely. In this case the child reported again in four weeks. By the end of that period the hair had started to grow again and its progress could be noted. A satisfactory regrowth was obtained in every case except those of favus and ectothrix infection which showed some trace of permanent baldness.

Regrowth of the hair after x-ray epilation often shows an increase in curliness over its previous condition. The number of curly-headed boys in Arbroath was at one time noteworthy, but to the relief of most of them this state is only temporary, and the hair gradually resumed its former condition and the curls disappeared in the hairdressers' shops.

Summary and Conclusions

After a review of the occurrence of ringworm of the scalp in Europe and the United States of America a summary of the incidence of this disease as seen in Dundee from 1914 to 1939 is given. Cases seen in the Eastern Region of Scotland from

July 1, 1946, to Dec. 31, 1947, are analysed, and show that, including two major epidemics during this period, out of 631 cases 98.4% were microsporon infections (97.1% *M. audouini*) and 84.15% were in boys. These figures correspond closely to recent figures from other parts of Scotland and from the U.S.A. Infection most commonly appeared to occur in barbers' shops.

Wood's light was found essential in the diagnosis and management of microsporon and favus infections but of no use in trichophyton cases.

Epilation by x rays or thallium is still the most rapid and successful means of cure, but fungicides assisted by a wetting agent in carbo-wax 1500 offer a chance of cure in at least a fair proportion of cases after a considerably longer period of treatment. It must be realized that, especially with the animal microspora, a modified kerion reaction may occur leading to spontaneous cure, so that in assessing the value of any "cure" for ringworm the actual fungus causing the condition and the criteria of cure must be known.

A brief note is made of the organization required for a centre to deal with cases of ringworm and the standards necessary for ensuring that patients are non-infectious before their return to school.

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CIRRHOSIS OF LIVER PRESENTING AS SEVERE ANAEMIA REPORT OF TWO CASES

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This paper concerns two cases of cirrhosis of the liver in which a severe anaemia, thought to be haemolytic, was the predominant feature. Both cases were sent to hospital because of anaemia, and cirrhosis of the liver was not diagnosed until after further investigation, in the second case not until necropsy. They are reported because haemolytic anaemia is said to be an uncommon complication of cirrhosis.

The anaemia accompanying cirrhosis of the liver is described as normocytic or macrocytic, and haemolysis is not a feature. The anaemia is seldom severe. Macrocytic cases resemble pernicious anaemia in some features (Whitby and Britton, 1946; Wintrobe, 1936; Wintrobe and Shumacker, 1933; Singer and Dameshek, 1941).

Davidson and Fullerton (1938) report a case of a macrocytic haemolytic anaemia in cirrhosis in which red-cell fragility was increased. Watson (1939), from studies of urobilinogen excretion, emphasizes that in some cases of cirrhosis a haemolytic element is present. He describes seven out of 38 cases of cirrhosis studied in which there was evidence of haemolysis. One of these had two severe haemolytic crises, during the second of which the patient died. Haemoglobin fell to the low level of 25%. Necropsy

revealed a diffusely cirrhotic liver, which on section showed portal cirrhosis. The liver was described as quite fatty. Femoral marrow was red.

Singer and Dameshek (1941) include disease of the liver among the relatively few conditions that can give rise to symptomatic haemolytic anaemia. They describe a case of subacute hepatitis in which a severe haemolytic anaemia was an important symptom: the haemoglobin fell to 27%, there was marked reticulocytosis, sternal puncture revealed a normoblastic hyperplasia, the anaemia was macrocytic, and fragility was normal.

Case 1

The patient, a man aged 66, was admitted to Townleys Hospital on Oct. 2, 1947, because of extreme pallor and shortness of breath. He had been working as a lorry driver up to three weeks before admission. He gave a history of vague abdominal pain and lack of appetite for several months. He had been a heavy beer-drinker for 30 years. He was extremely pale with an icteric tinge. Liver was enlarged to the umbilicus and the spleen was palpable two fingerbreadths below the costal margin. A blood count showed: Hb, 18%; red cells, 890,000; C.I., 1. The red cells appeared normal in size and shape. Biochemical findings supported a diagnosis of cirrhosis of the liver. The van den Bergh test gave a positive direct reaction; total serum bilirubin was 2.6 mg. per 100 ml. Thymol turbidity was 12 units. Serum globulin was raised to 4.1 g. per 100 ml., serum albumin was 3.3 g. per 100 ml., and the albumin-globulin ratio was reversed. Urine gave a strong reaction for urobilinogen and contained a trace of bilirubin. Tests for occult blood in the faeces were negative on three occasions.

The patient received a series of blood transfusions until he died 21 days after he was admitted to hospital. Although he showed no obvious reaction to these transfusions it soon became evident that the transfused cells were rapidly destroyed, because the rise in haemoglobin obtained was very small. Twelve days after admission to hospital he had received 11 pints (6.25 litres) of blood and his haemoglobin had varied between 28 and 35%. Shortly before he died he received the packed cells from 3 pints (1.7 litres) of blood and the haemoglobin was raised to 45%.

At necropsy the liver was of normal size and showed a diffuse cirrhosis; the spleen was enlarged to twice normal size. Section showed a portal cirrhosis with the architecture of the lobules destroyed by numerous bands of young fibrous tissue insinuated between the liver cells. There were considerable deposits of iron pigment in the liver and spleen.

Case 2

A woman aged 58 was admitted to Townleys Hospital on April 1, 1948, because of pallor and dyspnoea. She gave a history of vague ill-health for over a year and had recently had a small vaginal haemorrhage. She had been living on a very poor diet for a long time and said the only thing she really cared for was a glass of beer.

On examination the patient was pale, slightly icteric, and looked very ill. There were purpuric spots on forearm, thighs, and buttocks. She was obese, but it was thought that a tumour (? liver) could be felt in the right hypochondrium. Pelvic examination revealed nothing abnormal. The blood count on admission was as follows: Hb, 29%; red cells, 1,410,000; C.I., 1.03; reticulocytes, 22.5%; white cells, 4,600; normal differential; platelets, 160,000; bleeding and clotting time, normal. There was a little anisocytosis, but the majority of red cells appeared normal in size. Five orthochromatic normoblasts were seen while counting 100 white cells. Biochemical findings were as follows: van den Bergh test gave a positive direct reaction, serum bilirubin 3 mg. per 100 ml.; direct/indirect quotient (Gray, 1947) 68. Thymol turbidity was normal (4 units), alkaline phosphatase normal (10 units), and urine gave a very strong reaction for urobilinogen and contained a trace of bilirubin. No occult blood was found in the stools. The patient was given 3 pints of blood, which raised her haemoglobin to 55%, but her clinical condition showed