

cedure is quite simple. I should mention here that general practice, in spite of there being a specialist training, is in a poor way. There is a great shortage of GPs, particularly in country areas and some suburbs, and the average age of existing GPs is high. Possibly a British doctor prepared to work hard in areas regarded as medically less attractive by his German colleagues would be given considerable encouragement and even financial support from the community to do so.

In the interest of clarity I have omitted a great deal of detail. Someone who is seriously considering coming over should pay some attention to questions of health insurance, social security, superannuation, and medical defence insurance but what he should do about each of these depends on what he is planning to do.

Further information

Useful addresses are given below, and if I can give anyone help or advice I shall be pleased to do so.

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Bone and Joint Diseases

Perthes's disease

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Despite all the advances of recent times, discussion and controversy still continue on the management of Perthes's disease. Not even the name is finally agreed, varying from coxa plana¹ and osteochondritis coxa juva, on the one hand, to Perthes's disease, Legg-Perthes's disease, or Calvé-Legg-Perthes's disease on the other. Central to the whole of this discussion is the major underlying problem of the indications for and methods of treatment and whether or not the treatment advised really alters the natural history of the untreated disease. This thought introduces and underlies the importance of control in evaluating results of reported series.

In published reports on this problem trends may be seen maturing over the years. The course of the radiological changes was clearly described by Waldenstrom,² and indeed he mentions cases in which the posterior part of the femoral head was radiologically normal. This point was further emphasised by O'Gara³ in ascribing a good prognosis to his anterior Perthes's disease. Ponsetti⁴ continued this concept, suggesting that the prognosis was proportional to the degree of radiological abnormality of the epiphysis. Eyre-Brooke,⁵ in an earlier comprehensive review, suggested that the important prognostic factors at the time of diagnosis were age of patient, stage of the disease at diagnosis, and efficiency of treatment. These factors have stood the test of time, and many authors would add that girls have a worse prognosis than boys.

Many authors are concerned only with short-term prognosis and the hope that treatment may influence this. They tend to forget the importance of long-term changes, particularly remodelling and premature fusion of part or all of the growth areas of the femoral head and neck, on the ultimate fate of the

head and the development of osteoarthritic changes. Sundt⁶ considered that treatment does not prevent the onset of osteoarthrosis of the hip, which depends on the sphericity of the head. Ratliff,⁷ however, considered that these changes may be long-delayed provided that there is a state of congruous incongruity. Sommerville states that satisfactory development of the femoral head will occur even if it is ischaemic, provided that the head is contained within the acetabulum.⁸

Trends in treatment follow a similar pendulum, swinging between no treatment and treatment combining the principles of weight relief and containment of the femoral head in the socket of the acetabulum. Every method had its supporters but results have seldom been compared with those in untreated controls. In 1929 Parker⁹ and later Bristow¹⁰ advised treatment with legs in wide abduction so that the deeply contained femoral head would be moulded by the bony acetabulum. In considering the question of weight relief, Evans and Lloyd-Roberts¹¹ showed that in carefully matched series treated by bed rest or a weight-relieving caliper there was no difference in the overall results. More recently, containment of the femoral head by either femoral¹² or innominate osteotomy¹¹ permits this principle to be applied in the ambulant patient, but this may also be achieved by containment splints or plasters. For the non-operative treatments, opinion is not clear on when the treatment should be discontinued.

Before treating any child with Perthes's disease the following questions must be answered: What is the natural history of the process? Is it possible to anticipate the poor result? and What are the indications for treatment and on what principles should it be based?

Natural History

During a review of a large series of patients in 1971 I collected 95 patients whose hips had not been treated during the active phase of the disease.¹⁵ The cases were subdivided into four groups, based on the degree of radiological involvement. The results showed that the overall prognosis is proportional to the degree of radiological abnormality (table I).

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The identification of each group (table II; figs 1-4) cannot be made without adequate anteroposterior and lateral radiographs. If a patient presents with a hip showing signs of irritability adequate radiographs can be obtained only after a period of traction. At the onset of the disease an increase in the inferomedial joint space may be the only radiological sign of Perthes's disease, and in these cases further radiographs must be obtained after eight to ten weeks before it may be possible to establish the group (figs 5-8).

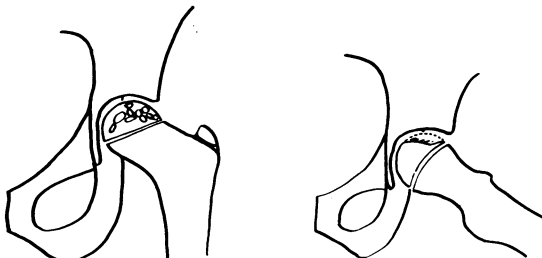


FIG 1—Group 1.

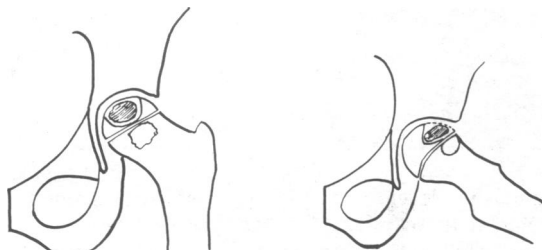


FIG 2—Group 2.

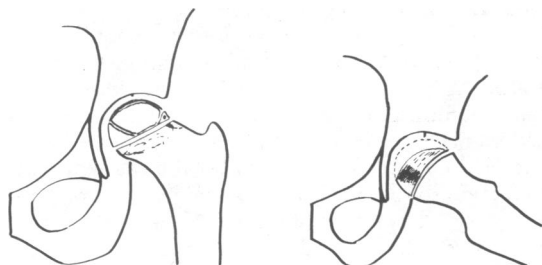


FIG 3—Group 3.

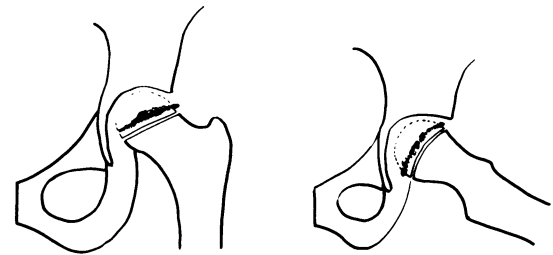


FIG 4—Group 4.

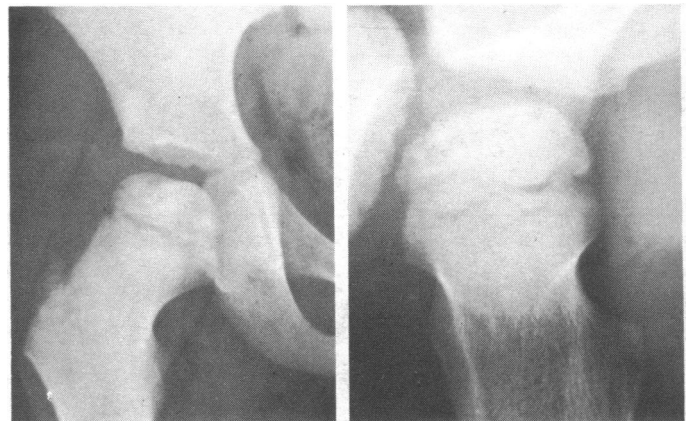


FIG 5—Group 1. Left: anteroposterior radiograph. Right: lateral radiograph.

Factors in prognosis

Age—Most authors agree on the importance of age in prognosis. I did not find any appreciable difference in the age of onset between the groups. In particular, poor results can occur in disease starting at 3 years and good results in disease starting at 9 years. The importance of youth would seem that, being lighter and smaller, young children are less likely to deform the femoral head. In addition they have longer to remodel the epiphysis after healing (fig 9). Synder,¹⁸ however, suggests that this improvement will only occur provided that the growth plates around the epiphysis remain open. In this context of 75 children followed up 10 years after healing, 25 had improved by one result category (fair to good, good to excellent) and five by two points. All these latter cases had disease before the age of 5 years.

Sex—It is generally accepted that the prognosis for girls is worse than that for boys. This is because there is a higher proportion of girls in groups 3 and 4, indicating that they have a greater degree of radiological abnormalities.

Stage of the disease at diagnosis

The stage of the disease at diagnosis has always been regarded as important, as treatment in early disease is more likely to be effective in preventing deterioration in the shape of the femoral head. Conversely, once flattening has occurred treatment should be considered only if it will reverse the change. Arthrography will confirm head shape in established disease and should be used to show head shape and congruity if treatment is being considered in advanced disease.

TABLE I—Results of 95 hips receiving no treatment

	Good	Fair	Poor	
Group 1	26	1	0	
Group 2	23	6	2	
Group 3	5	7	11	
Group 4	0	4	10	
	} 90%		} 91%	

TABLE II—Radiological signs to establishing the group to which the case should be assigned

	Figure	Sex ratio male:female	Sequestrum	Subchondral fracture line	Metaphyseal reaction	Posterior metaphyseal remodelling	Triangle appearance lateral aspect of epiphysis
Group 1	1	8.8:1	No	No	No	No	No
Group 2	2	4.9:1	Yes	Anterior half	Localised anterior	No	No
Group 3	3	3.5:1	Yes	Posterior half	Diffuse and localised anterior reaction	No	Occasionally
Group 4	4	3.0:1	Yes	Reaches posterior margin	Diffuse or central	Yes	In early stages

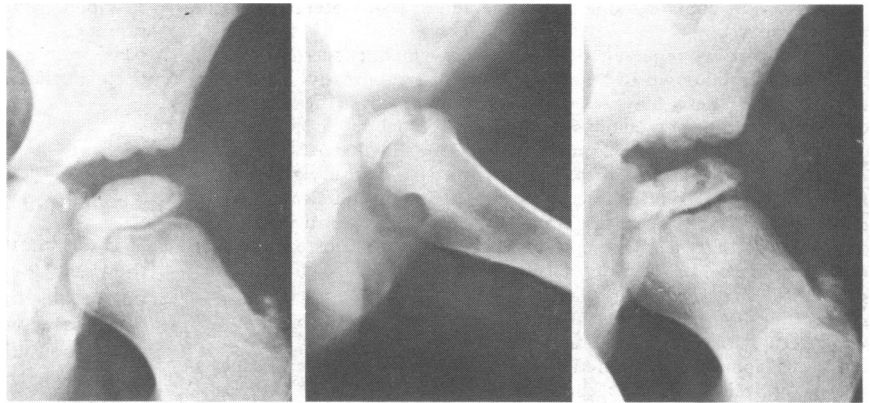


FIG 6—Group 2. Left: anteroposterior radiograph, July 1957. Centre: Lateral radiograph, July 1957. Right: anteroposterior radiograph, March 1958.

Once healing has started no further deterioration will occur. This is important in that once it is established surgery is indicated only when arthrography shows improved congruency of the joint and therefore its long-term remodelling effect. The signs of early healing are an increase in the height and quality of the lateral fragment of the epiphysis.

If treatment is being advised once the stage of fragmentation has been reached we must be sure that it will really alter the natural history of the process and not just pacify the consciences of the doctor and parents at the expense of the child.

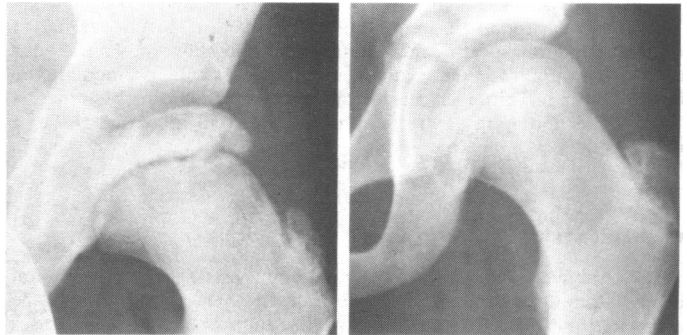


FIG 9—Left: August 1958—radiograph of 5-year-old child with group 2 disease at time of healing; result: fair. Right: January 1964; result: good.

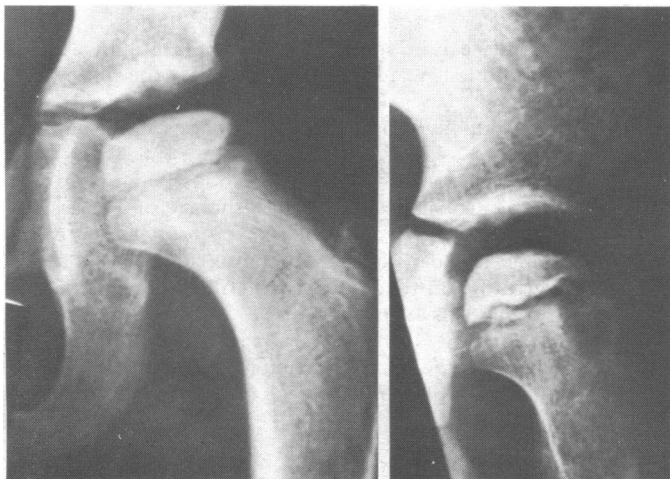


FIG 7—Group 3. Left: anteroposterior radiograph. Right: lateral radiograph.

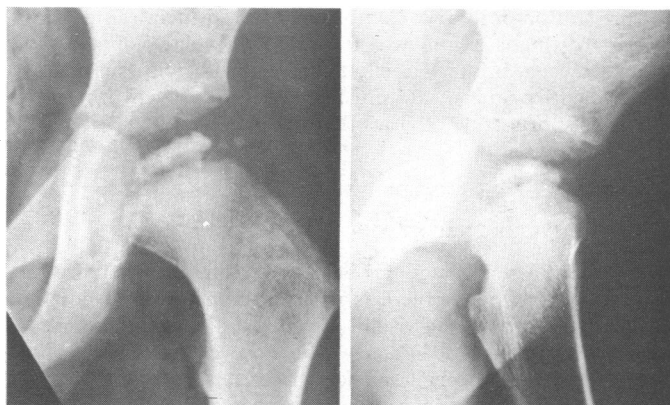


FIG 8—Group 4. Left: anteroposterior radiograph. Right: lateral radiograph.

Long-term prognosis

Reports of long-term follow-up are relatively few. Sundt⁴ considered that all cases will eventually develop osteoarthritis of the hip. Ratliff's⁷ series, however, emphasised the remarkable long-term success of hips in which there was considerable femoral head flattening. The reason for this success seems to be that the flattened femoral head is, in fact, congruent in the acetabulum or in a state of "congruous incongruity." The converse of this is "incongruous incongruity," seen in the poor results in the older group 3 cases, which seem to develop an early and progressive osteoarthritis. This difference in the long-term prognosis probably lies in the surface area of contact between the femoral head and acetabulum, which, although it does not permit a full range of movement, has a normal stress-loading without high spots.

I have already mentioned the premature epiphyseal fusion, particularly of the lateral part of the growth plate. This leads to progressive head shape change after healing. Of the 75 cases already discussed, two had deteriorated by one result grade, and in all of these the deterioration was due to progressive overgrowth of the lateral margin of the femoral head.

Concept of the "head at risk"

If it is accepted that about 60% of cases achieve a good result without treatment (table I) then we must select for treatment only those cases in which a poor or fair result will occur or our results will be biased by the potentially good cases included in our treatment series.

The actual process of epiphyseal flattening is not understood but seems to result from two processes. Firstly, there is broadening of the femoral head associated with one or more episodes of infarction that may occur at varying times during the course of the disease,¹⁷⁻¹⁹ and, secondly, there is the effect of trauma on the newly formed bone, producing a physical alteration in head shape. Changes in the metaphysis are more difficult to understand but are possibly the result of infarction with reabsorption of bone, disturbance of growth, and osteoporosis. These factors do not explain, however, why they are

often found as demarcated areas on the anterior and lateral aspect of the metaphysis.

As clinicians we require radiological signs which, occurring early in the disease, are known to be associated with a progressive change in head shape. These may be considered under three headings: (a) epiphyseal signs, (b) metaphyseal signs, and (c) lateral subluxation.

Epiphyseal signs—Increasing radiological involvement of the epiphysis is associated with a reduction in size of the viable lateral fragment, which is often seen as a small dot of calcification. The earliest sign of epiphyseal flattening is that this spot of calcification is observed just lateral to the epiphysis, and later a periosteal reaction develops on the lateral side of the neck. Both are always a serious prognostic sign. Similarly Gage's²⁰ sign seen as an erosion in the lateral epiphyseal and adjacent metaphysis represents a structurally weak area liable to deformation by trauma. In group 4 disease a triangular appearance is noted on both the medial and lateral aspects of the epiphysis and by implication of group carries a serious prognosis.

Metaphyseal changes—Radiologically metaphyseal lesions are localised, diffuse, or both. When localised they usually lie in the anterolateral aspect of the metaphysis but may occasionally be central in group 4 disease. When diffuse the change starts anteriorly, reaching the junction of the affected and unaffected areas. Both these lesions represent areas of structural weakness, and the axis of part or all of the growth plate may be altered by "infarction" of the plate into the weak areas.

Lateral subluxation—Lateral subluxation leading to uncovering of the anterolateral aspect of the femoral head will allow the lateral edge of the acetabulum to "dent" its lateral margin. It will also increase the tendency for infarction of any metaphyseal lesion. Both these factors will lead to flattening of the femoral head and an increased risk of a poor result.

Head at risk

If the above factors are accepted as being associated with femoral head flattening then signs may be defined that together would be associated with cases proceeding to a fair or poor result. Such cases may be considered "at risk" and would have the following signs: (a) calcification lateral to the epiphysis (fig 6), (b) Gage's sign, (c) lateral subluxation, (d) diffuse metaphyseal reaction, and (e) a horizontal growth plate.

The presence of two or more of these signs should be regarded with suspicion and bias the clinician in favour of advising treatment. The outcome in untreated patients is shown in table III, which indicates



FIG 10—Calcification lateral to the epiphysis.

TABLE III—Results of untreated cases comparing at risk cases with those not at risk

		Good	Fair	Poor
Group 2	At risk	12	6	2
	Not at risk	12	1	0
Group 3	At risk	5	5	3
	Not at risk	2	4	0
Group 4	At risk	0	5	10
	Not at risk	0	0	0

that poor results do not ensue in patients who are not at risk. The presence of three or more of these signs should be regarded with considerable apprehension as considerable head shape change may occur in the next three months.

Treatment

It is the question of treatment of Perthes's disease that causes the greatest controversies in management. I hope that it has now been realised that if treatment is to be advised it must be only in those cases when it will alter the long-term prognosis.

To look at this problem we must answer our third question. "What are the indications for treatment and what form should it take?" To this we should add a further question for non-operative treatment: "When should treatment be terminated?"

INDICATIONS

If the factors discussed previously are accepted in principle then the indications for treatment by "supervised neglect" or no treatment are: (a) group 1, (b) groups 2 and 3 under 5 years not at risk, (c) groups 2 and 3 over 5 years not at risk, (d) cases in which healing is established, and (e) cases in which serious head shape change has occurred. The cases in groups 2 and 3 are separated by age because over the age of 5 years many patients will ultimately become "at risk" and they need particularly careful supervision. Once healing is established, further deterioration in head shape will not occur in the short term, and treatment should be reserved only for healing cases when improved congruity can be shown to occur arthrographically.

Definitive treatment would be indicated in the following cases: (a) all "at risk" cases, (b) groups 2 and 3 over 7 years not at risk, and (c) group 4 when femoral head shape change has not occurred.

The further separation of the cases in groups 2 and 3 by age is made as experience suggests that over the age of 7 years all these cases will ultimately become at risk. In group 4 cases early head shape change is usual, and if treatment is considered it must be shown by arthrogram that the head is still round.

Between the two sets of indications lie a few cases needing symptomatic treatment such as short courses of traction for "irritable hip syndrome" and adductor tenotomy plus four weeks in an abduction plaster to correct adduction deformity.

PRINCIPLES

Published reports on the treatment of Perthes's disease suggest two major principles of treatment: containment of the femoral head within the mould of the acetabulum; and relief of weight. To these two principles should be added a further important one: prevention of injury. Combining these principles produces several treatment regimens. Particularly when containment splints are used, injury is easily prevented, but with surgical or no-treatment regimens care must be taken to prevent injury by restricting sports and activities that include jumping.

NON-OPERATIVE TREATMENT

Over the years splintage has been the treatment of choice for many patients. One problem is whether or not weight-bearing may be permitted. Harrison²¹ introduced the first mobile containment splint and Petrie²² the first containment splint permitting weight-bearing. These two series report similar results but are not compared with untreated controls, and the validity of these results cannot therefore be strictly evaluated.

They would suggest, however, that provided containment can be maintained weight-bearing may be permitted. The weight-relieving splints have the other disadvantage that unless carefully supervised shortening of the leg may occur. The second problem with all these conservative treatments is when to stop. The advocates of these methods have their criteria, but the end point is always difficult to define.

OPERATIVE TREATMENT

The good results of treatment by femoral and innominate osteotomy have continued to be reported since the first report by Soeur²³ and later Axer.¹² Only one report compares treated cases with untreated controls.²⁴ The conclusions in this series suggest that osteotomy could improve the short-term prognosis in patients in groups 2, 3, and 4 and particularly in those aged over 6 years and at risk. An interesting feature of this report is that patients with poor results had an interval of 21 months between the onset of symptoms and the time of operation, whereas this interval was seven months for those with a good result. This must suggest that by this point the shape of the head had altered, and that improving containment did not alter this shape.

Innominate osteotomy is reported by Salter¹⁴ to improve the short-term prognosis but his comparison is with cases treated by bracing and not with untreated controls.

The great advantage of surgery is that after union of osteotomy the child needs no splints or braces and full activity may be permitted.

ONE HUNDRED YEARS AGO Upon the question of the admission of women to our profession, I cordially agree with that which has been said by my predecessor in office. Of all the professions into which women might seek to be admitted, that of medicine is, in my opinion, the least suitable. There would be far less objection to women entering many other professions, for instance, that of the law. There is no physical difficulty to prevent a woman from performing the duties of attorney or solicitor; and even at the bar there is no reason as regards physical capability, that she should not exercise as a barrister the persuasive powers of her sex. The profession of a civil engineer, in its various forms, I would also suggest as a more suitable sphere for female enterprise; and I should add that of the Church, were women not debarred by the apostolic injunction. From the practice of the medical profession, women are, in my opinion, shut out by physical incapacity, and, handicapped heavily as they are by nature, they would stand but little chance of success in competition with men. How is it possible for a woman on a rough and perhaps wintry night to ride some five or six miles in an exposed country, to visit a patient who may require at the end of such a journey a doctor with clear judgment and a steady hand? It may be answered that women would not undertake the ordinary responsibilities of practice, but would devote themselves to special branches, such as midwifery, eye or skin disease. Such an arrangement would, however, be most unsatisfactory to the public. It is not desirable that practitioners should be educated to practise in particular departments, but it is expedient that all should be educated in every branch, and that they should afterwards select such departments of practice as they might feel themselves most qualified for. This is to a great extent the case at present; and if we look to the most successful specialists of the day, we find that they are, as a rule, men well educated generally in their profession, but that they have adopted some special department either because they possess a natural taste in that particular direction, or because accidental circumstances have thrown them in the way of a particular department of practice. Such an arrangement as this is much to the advantage of the public, as it provides for them men having an aptitude for each particular speciality; and it is good for our profession, as it affords to those with particular talents a field in which they may exercise their gifts. The admission of women into the profession would crowd the practice of certain specialities, and would interfere with the natural selection which would otherwise take place. It is urged upon our profession that it stands upon a different footing from all others, and that it is bound to show a greater amount of liberality, and therefore should open its doors to all who seek admittance. I do not know that there is much in such an argument; but if it is conceded that women should have the opportunity of proving that

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they are capable of overcoming all the difficulties of the situation, and of practising our profession with success, it becomes a question upon what terms they are to be admitted. Upon this point I think that there is but one answer. If they are allowed to enter at all, let them be admitted freely, and let them accept all the responsibilities of the profession they join. I do not think that it is desirable that they should be admitted to some examination and not to others; but if they are allowed to join the profession, let them do so on the same footing as men. They should have a fair field and no favour; they must, of course, abandon their position as a privileged class, and should be admitted to the examinations on the same terms as men. I do not at all sanction the admission of women to lectures and hospital practice conjointly with male students; such an arrangement is open to the gravest objections; but when they have gone through the requisite study in a manner satisfactory to our examining corporations, they might be admitted to practice. It is, perhaps, natural that women should seek some field for useful occupation, as there is an excess of the female population, and in the ordinary course of events with the western practice of monogamy, there are a large number of women who never become mothers and do not preside over their own family circle. Is there, then, no sphere for usefulness for such individuals? As medical men we know that, at all events, in the upper and middle classes, spinster aunts frequently perform the most valuable services, assisting their brothers and sisters in the management of their families when from sickness or other cause the natural protector is unable to take care of them. Those individuals, whom we term with some degree of pleasantry but not without truth "unappropriated blessings," have a very important part to play in social life. We have frequent reason to lament that there is no spinster aunt or sister at hand to take charge of some poor invalid. I cannot think, therefore, that lack of useful employment can drive many to seek occupation in a sphere outside their own family. The work of women is not less dignified, and should not be less intellectual, than that of men; but they are protected against the rough and stormy conditions to which men are exposed. These asperities of life would break down the more sensitive and delicate nature of a cultivated woman, and would render her incapable of discharging her duties. Beyond this, there is the still weightier reason that it is scarcely possible for a woman to go through a course of medical education without losing that simplicity and purity of character which we so much value; there are subjects which cannot be discussed with freedom between the two sexes, and there are many matters with which women had better not be acquainted. I think, therefore, that in the truest interest of women it is better that they should not practise the medical profession. (*British Medical Journal*, 1877.)