unilateral, the left heel being affected in my small series of fourteen cases much more frequently than the right. The ages of the patients varied from 8½ to 15 years. In only one, in whom the affection was started by a jumping competition, was anything in the way of unusual trauma discovered. The diagnosis depends on local pain and tenderness and the *x*-ray changes. The pain is definitely in the heel and not beneath it, and is aggravated by violent exercise; the tenderness is on one or both sides, at the margin of the epiphyseal line, and occasionally at the back of the heel; swelling may be present, but is often absent. Flat-foot may be present, and occasionally there is some shortening of the calf muscles. Radiograms show a fluffy, eaten-out, or fragmented epiphysis with unusual irregularity of the adjacent posterior surface of the body of the os calcis. Great irregularity of this surface has been met with—in a large number of radiograms specially examined—only when symptoms of the disease had been present at some time or other in the case. It must be remembered that the epiphysis may ossify by more than one centre, and, as in the case of Schlatter's disease, radiograms must be examined in conjunction with the clinical evidence, unless the changes are very marked or unilateral. This is apt to be a chronic complaint, and while only occasionally is complete rest, even in plaster, indicated, abstention from all violent exercise may have to be enforced for several months. Cure, as in the case of the tibial tubercle, takes place when fusion of the epiphysis with the rest of the bone occurs, but fortunately symptoms may subside long before this. The later the affection occurs the better, therefore, the prognosis. One case of a relapse after an interval of two years was met with. I will now show you radiograms of three cases:

(*a*) A girl, aged 8½, with pain on the inner side of the left heel of some months' duration.

(*b*) A boy, aged 12, with pain in the right heel for two months. Irregularity of the subepiphyseal surface of the body of the bone is well marked. Later the other heel developed symptoms.

(*c*) A girl, aged 13, with pain in the right heel of two months' duration. She complains of pain and tenderness after running or jumping. Flat-foot is present. The radiogram shows fragmented, fluffy epiphysis on the right side.

Precisely similar in nature is an affection of the tubercle of the tarsal scaphoid, to which is attached, of course, the tibialis posticus tendon. I have seen both the scaphoid and the os calcis affected in the same foot. It may be as well to say that I am not speaking of Köhler's disease, or isolated disease of the navicular, but of an entirely different condition. Here we are dealing with an affection of the navicular tubercle only, and not of the whole bone. A child or adolescent complains of painful flat-foot, the navicular tubercle being unusually prominent, painful, and tender, the tenderness being usually on the posterior aspect of the process rather than on the tip, which might well be rubbed by the boots. An interesting fact, and one I have not seen mentioned, is that almost invariably a separate centre of ossification is present in these cases for this tubercle—the so-called os tibiale externum. In 11 cases, with bilateral symptoms in 7, making 18 feet in all, one or more centres of ossification for the tubercle were present in 13, in 2 others there is a questionably minute fragment of bone, while in one double case radiograms are not available to decide the point. The presence of an epiphysis at this point makes the anatomical conditions similar to those in the heel and the tibial tubercle. In only one or two has there been any suggestion of fluffiness of this epiphysis, if we may so call it. Girls are nearly twice as commonly affected as boys, in contrast to the heel cases, the ages varying from 9½ to 16 years in my series, the girls being rather younger. The sides are equally affected. The undue prominence of the tubercle, which is of course extremely common in painless flat-feet in children, is often equally great on the two sides, even though signs and symptoms are unilateral, while the os tibiale externum is usually bilateral. It is not known, so far as I am aware, what is the usual fate of this bone. It certainly may remain as a separate fragment throughout life, while the appearances seen in some feet strongly suggest that a separate bone had been present and had united to the navicular. The feet are almost invariably flat, and in rare cases the calf is contracted. These cases are not quite so obstinate as the heel cases. Treatment should aim at supporting the arches and ordering a varying degree of rest according to the severity of the symptoms. Plaster may be advisable for a time. Exercises, etc., for the cure of the flat-foot must be delayed till all pain and tenderness have disappeared. I will show you radiograms of three typical examples:

(*a*) Boy, aged 13, with local pain and swelling for ten days only of the left navicular tubercle. Slight valgus was present; os tibiale externum on both sides, but larger on the left.

(*b*) Girl, aged 14, with bilateral flat-foot. Prominent navicular tubercle on the left. Tender at back. Pain on walking much for some weeks. There is some irregularity of the os tibiale externum on the left.

(*c*) Boy, aged 13, with prominence of both navicular tubercles, but only the right was tender at back. Three fragments of bone are seen in the region of the navicular tubercle.

Another radiogram is from a woman of 51 who had turned her ankle in 1923 and had had pain in the foot ever since. An os tibiale externum is present on both sides, but on the right the bone is apparently fractured. I have not met with a similar radiogram. A month's rest was followed by return of pain as soon as she got up again. Removal of the bone was recommended.

I now want to show you a radiogram in which is seen a separate centre of ossification for the internal malleolus. This is a very rare condition and apparently unknown to many anatomists. Curiously enough I have met with 5 cases: in 3 the condition was bilateral, in 2 unilateral; 4 had severe flat-foot with pain, one also having peroneal spasm: the condition was only revealed by routine *x*-ray examination. Only 2 showed any local signs, and in these the tenderness, and in one also some swelling behind and below the malleolus, rather suggested teno-synovitis of the tibialis posticus tendon, but this could not be connected, directly at any rate, with the presence of this separate epiphysis. The radiogram shown is from a girl aged 10 who complained of pain and flat-foot. She had been kicked on the right ankle five months previously, and when seen there was a puffy, tender swelling below the internal malleolus on this side. The separate epiphysis is bilateral. It is extremely unlikely that the existence of this epiphysis had any relation to the symptoms.

Lastly I show you a case of dislocation of the elbow with separation of the epiphysis of the internal epicondyle. During reduction by the doctor, the separated internal epicondyle was by some chance caught between the humerus and ulna. At operation we were able to free the detached piece of bone, and, after drilling it, to stitch it back somewhere near its correct position. This would appear to be a very rare condition, though, as often happens with rare affections, four such cases have been met with in the last two years; in each the diagnosis has been confirmed at operation. It would appear to be advisable to keep these cases in mind, particularly when recovery is delayed after reduction of a dislocation of the elbow.

A DIABETIC DIET: THE LINE RATION SCHEME.

BY

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EVERYONE recognizes that the most difficult part of the battle, both for the doctor and the patient, is not the insulin but the quantitative diet necessary in severe cases. A diet should be accurate and simple and yet permit of variety to suit all tastes and purses. If the diet is accurate and simple yet rigid, like Dr. Graham's "ladder" diet, it often defeats its own object by the patient getting tired of the monotony. If the scheme is accurate and still permits of choice and variety, like the scheme of Dr. Harrison and myself,[1] where the prescription of so many grams of carbohydrate, protein, and fat has to be translated into weights of food by the patient himself or his doctor, a few days' training and explanation is required, unless the patient is intelligent.

The following line ration scheme meets the requirements both of the busy doctor and the patient. The doctor has only to divide the patient's weight by a factor to be able to prescribe the correct rations for the day, and two minutes suffice for all the necessary instructions to the patient. Thus treatment can be commenced outside an institution, and no preliminary starvation is involved now that insulin can take its place. The scheme is shown in the appended table. Each complete line is called a ration and consists of a standard amount of carbohydrate, protein, and fat. The diet is prescribed as so many lines, or rations, a day. To calculate the appropriate number of rations the physician has only to divide the body weight in pounds by 16 (16.5 is more exact). Thus if a man weighs 165 lb. he will get 10 rations—that is, ten lines a day. (Unlike the schoolboy, the worse the diabetic the fewer "lines" he ultimately gets.) Each line is divided into two parts: the first half-line containing the carbohydrate and the second half-line the protein and fat. Any first half-line can be combined with any second half-line to make a ration. The number of rations a day is divided as desired between the different meals with regard to when insulin is given and other considerations. Suppose a patient gets three rations for breakfast: he can take 3½ oz. milk, 1/3 oz. bread, and 4 oz. tomato (three first half-lines containing carbohydrate), and one egg and 2/5 oz. of fat as butter and 2 oz. of bacon (three second half-lines, one of which has been taken twice). Thus the patient can choose his own food. The method is accurate and the lines exact in food value, with the exception of milk, whose content in protein and fat has been neglected for simplicity. The food values used are those of the food tables of Harrison and Lawrence, which are an average from all known authorities. The weight of cooked foods is given unless otherwise stated. The scheme has been planned on the following theoretic considerations.

The common successful practice is adopted of giving diets of low total calorific value composed of low carbohydrate, moderate protein, and high fat content. The proportion of carbohydrate to fat is such as to avoid appreciable acidosis (ketosis), the proportion of fatty acids to glucose being as 1.5 is to 1, as in Woodyatt's formula.[2] I aim at giving 1 gram of protein per kilogram of body weight (about 1/2 gram per lb.). This is more than many of the American school advocate, but giving less makes a miserable allowance from the patient's point of view. Each ration or line contains 5 grams of carbohydrate (the first half-line), 7.5 grams of protein, and 15 grams of fat (the second half-line). If we give 1 gram of protein per kilogram of weight, a man of 75 kg. will get 75 grams of protein a day. Now each ration contains 7.5 grams of protein, so that 75 ÷ 7.5 = 10; this is the number of rations for a man of 75 kg. It is the same thing to divide the weight in pounds—165 by 16.5 (7.5 kg. = 16.5 lb.). Now if we make protein the starting point and look upon it as unity (1 gram of protein per kilogram), the proportion of a ration is 0.66 gram of carbohydrate, 1 gram of protein, and 2 grams of fat, which equal 25 calories. Hence it follows that if we are giving 1 gram of protein per kilogram and the carbohydrate and fat are in the proportion arranged in the line, the total diet will also provide 25 calories per kilogram of body weight (11 calories per lb.). Thus it happens that the weight in kilograms divided by 7.5 (or pounds by 16.5) will always give us the number of rations that provide a diet of 25 calories per kilogram of body weight with the carbohydrate, protein, and fat in proper proportion.

The diet of 25 calories per kilogram is low, but makes a good starting point in the treatment. If the patient becomes sugar-free on it the diet can be raised later. If he does not become sugar-free with nearly normal blood sugars at the end of a week, insulin must be given. If the patient is losing weight and energy higher diets can be prescribed by dividing the body weight by other factors. The number of rations to provide a diet of 30, 35, or 40 calories can be calculated by dividing the body weight in pounds by 13.5, 11.8, or 10.3 respectively, the resulting diet still having the proper proportion of carbohydrate and fat to avoid acidosis, but the protein becoming more than 1 gram per kilogram. If this is undesirable, the extra calories can be added to the 25 calorie diet by giving extra carbohydrate and fat in the proportion of one first half-line to 1/2 or 1 oz. of fat—depending on whether the patient tolerates fat well or not. But a few patients may find this confusing, and the harmful effect of slightly increased protein is not clearly proved. Each line ration contains 190 calories, so that another method of calculating the number of rations a day is to divide the total calories desired by 190—1,900 calories being contained in ten rations.

THE "LINE RATION" DIET SCHEME.

Any first half-line added to any second half-line = one ration.

First Half-lines.		*Second Half-lines.*
Milk	3½ oz.	One egg and fat 2/5 oz.
*Bread	1/3 oz.	Bacon 1 oz.
*Oatmeal (raw) or biscuit	1/4 oz.	Ham 1 oz. and fat 1/4 oz.
Cabbage or greens	5½ oz.	Kipper 1½ oz. and fat 1/2 oz.
Tomato (raw or cooked)	4 oz.	Herring 1 oz. and fat 1/2 oz.
*Potato	3/4 oz.	Lean meat or mutton 1 oz. and fat 1/2 oz.
Cauliflower or French beans	6 oz.	Lean lamb or veal 1 oz. and fat 1/2 oz.
Brussels	5 oz.	Lean pork 1 oz. and fat 1/2 oz.
Spinach or asparagus	6 oz.	Chicken 1 oz. and fat 1/2 oz.
Turnip or carrot	4 oz.	Tongue (tinned) 1 oz. and fat 1/4 oz.
Onions, leeks, or marrow	3½ oz.	Liver 1 oz. and fat 1/2 oz.
Beetroot	2¾ oz.	Kidney or tripe 1½ oz. and fat 1/2 oz.
Lettuce (raw)	6 oz.	Rabbit 2/3 oz. and fat 1/2 oz.
Cucumber (raw)	5 oz.	Cheese 3/4 oz. and fat 1/3 oz.
Celery (raw)	5 oz.	White fish 1¼ oz. and fat 3 5 oz.
*Apple or pear (raw)	1½ oz.	Sardines 1 oz. and fat 1/4 oz.
Orange or strawberries	2 oz.	Salmon 1 oz. and fat 2/5 oz.
Rhubarb (stewed)	6 oz.	Crab or lobster 1½ oz. and fat 3/5 oz.
Apples or pears (stewed)	2½ oz.	Pheasant, grouse, or partridge 3/4 oz. and fat 1/2 oz.

Fats are meat fats, suet, dripping, butter, margarine, olive oil; thick cream (twice the amount).

* These articles to be taken only if specially allowed by the physician.

Doctor's Prescription.

Rations per day—
Breakfast: .....
Dinner: .....
Tea: .....
Supper: .....
Date.

The scheme is elastic and permits of easy modification to meet all requirements. In acidosis all or some of the fats can be omitted for a time. If the carbohydrate tolerance is high or improves, extra carbohydrate can be added as extra first half-lines. It may eventually be found that a quantitative diet has become unnecessary and qualitative restrictions alone will control the disease.

I find the scheme works admirably. From the doctor's point of view it eliminates the lengthy planning of diets; the patient has only to be weighed to calculate his initial diet and subsequent adjustments are easy. Patients themselves can grasp the scheme in two minutes, and the only tax on them is the accurate weighing, to which they gladly submit when they feel the benefit of it. Letter scales modified, and costing four to five shillings, meet the purpose in cases of forced economy; otherwise some type of confectioner's scale is preferable. I use this scheme particularly for out-patients and for those who are not very intelligent.* Really intelligent patients seem to prefer the scheme of Dr. Harrison and myself, taking a pride in the accuracy and variety of their diets.

REFERENCES.

[1] G. A. Harrison and R. D. Lawrence: *Food Tables*, 1924. [2] Woodyatt: *Arch. Int. Med.*, 28, 125, 1921.

SPONTANEOUS RUPTURE OF THE HEART.

BY

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WE have read with much interest the reports of five cases of spontaneous rupture of the heart recorded in the BRITISH MEDICAL JOURNAL for August 30th (p. 373), September 13th (p. 465), and October 11th, 1924 (p. 669). The following is an account of the clinical history and *post-mortem* examination of a heart which had ruptured in a patient under the care of Dr. Skeen, Fife and Kinross District Asylum.

CLINICAL HISTORY.

The patient, who was the subject of old-standing dementia, died in November, 1922, at the age of 65. During February, 1917, she had cardiac attacks, and again in May, 1921. She was slow in her movements, rather decrepit, and frail-looking. She did not perform any work, but wandered about aimlessly, at a gentle pace. There was never any dyspnoea. The extremities, nose, chin, and ears were occasionally cyanosed. Prior to her death she was walking quietly on a level piece of ground, neither evincing nor experiencing excitement. She was observed to drop down, and died a few moments later.

* This scheme, amplified and with explanation for doctors and instructions for patients, can be obtained in a convenient card form from Messrs. Lewis and Co.