confirm it in 5 years' time. Is this correct? Have you any plans for extending this investigation?

DR. WOOD Not at the moment. Our initial object has been to find quick answers to guide future work, but we have not yet finished digesting even these preliminary analyses.

DR. HILL (Stoke Mandeville) The old criteria of definite and probable comes out if you take out the serology as we did in our follow-up studies of sheep cell tests.

DR. WOOD We are hoping to validate this by further analysis of our data.

PROF. BYWATERS (Taplow) I would support strongly the thesis that the follow-up is the ultimate validation of any particular theory. In a sense you have taken this into account. The final diagnosis is in fact a follow-up from when you first saw the patient.

PROF. KELLGREN (Manchester) I should like to enlarge on this. For example, with gout, which is very much easier than all the other diagnoses, nearly all the patients in this study have had subsequent elaborate work-outs.

PROF. DUTHIE (Edinburgh) We collected 300 patients thought to have rheumatoid arthritis and followed them for roughly 10 years. I admit that a few subsequently developed psoriasis, but very few of the patients having rheumatoid arthritis and studied for 10 years proved to have anything different at the end. This did not involve the use of any specific set of criteria.

PROF. BYWATERS (Taplow) Follow-up is an elastic term. There are always a significant number of people with a few painful swollen joints in whom the diagnosis is unclear. Some of these subside undiagnosed and others may turn out to be due to all sorts of things; in this diagnostic classification most of these were presumably put down under 'poly-arthritis not yet diagnosed'. The point I want to make is that all patients in whom there is doubt about the final diagnosis ought to be followed-up. This should be extremely informative.

DR. GLYN (London) To me, the most startling revelation is the unreliability of 'early morning stiffness' as a diagnostic symptom. I have always regarded it as extremely reliable in a purely clinical context. Can you tell us how you defined and assessed early morning stiffness in your survey?

DR. WOOD At the New York meeting, it was suggested that Cobb's standard question should be used. In our data, the physician's assessment was much more satisfactory; by this method most of the rheumatoid subjects had morning stiffness, but on the other hand so did 70 per cent. of those without rheumatoid arthritis. When we used Cobb's question only 67 per cent. of the rheumatoid patients had morning stiffness, and only 41 per cent. of those with no rheumatism at all were stiff. One of our main objects was to demonstrate differences like this.

DR. WRIGHT (Leeds) As regards the radiography of the sacroiliac joints, you have stressed how important this is in the diagnosis of spondylitis. In our epidemiological studies with families of patients with ulcerative colitis, we undressed our patients, and we shall be reporting the

reproducibility of the reading of the sacroiliac joint films. I know that in your Unit you did not at one time undress the patients. I should have thought that the difficulty of reading these films is such that undressing the patient is essential.

DR. WOOD The point is well made. If one irradiates the pelvis one must be sure of getting a good radiograph. In the population survey that formed part of this work, we complied with this requirement, and in none of the pelvic radiographs was interpretation obstructed by corset bones.

Power Rise Chair. A film shown by **MR. R. E. PATTINSON** and **DR. V. WRIGHT (Leeds)**

Discussion

PROF. DUTHIE (Edinburgh) Where does your power come from?

MR. PATTINSON From a hydraulic pump driven by an electric motor.

DR. YEOMAN (Harrogate) What is the cost of this chair?

MR. PATTINSON About £160, with an inclusion of 13 per cent. tax since it is classed as furniture.

PROF. DUTHIE (Edinburgh) Has it thrown anybody flat on their face?

MR. PATTINSON It has never done this.

PROF. DUTHIE (Edinburgh) Is it fixed at all?

MR. PATTINSON The opening of the film did not show this. The chair is on castors which are retractable.

PROF. KELLGREN (Manchester) Have you carried out any therapeutic trials comparing this elaborate device with an ordinary balanced chair?

DR. WRIGHT Yes. The man with severe ankylosing spondylitis whom you saw in the film, for instance could rise to his feet only with the use of the chair demonstrated.

DR. HILL (Stoke Mandeville) This is ideal, but it did just worry me that the patient looked apprehensive in the upright position.

MR. PATTINSON I think a period of education would help.

PROF. DUTHIE (Edinburgh) Would a seat-belt help?

DR. HILL (Stoke Mandeville) Is there any stand for the feet?

MR. PATTINSON We suggest that a rubber mat is placed in front.

Significance of Antinuclear Factor in the Connective Tissue Diseases. By **N. R. ROWELL** and **J. S. BECK (Leeds)**

Using the unfixed rat liver immunofluorescence test, the incidence, titres, and types of antinuclear antibodies were investigated in more than 500 patients. The results of serial observations over periods up to 9 years

showed that the connective tissue diseases can be divided into two groups. In the first group, which includes lupus erythematosus and systemic sclerosis, antinuclear antibodies are frequently found in high titre, whereas in the second group, which includes polyarteritis nodosa, cutaneous vasculitis, and dermatomyositis, antinuclear antibodies are usually absent. The rat liver immunofluorescence test is thus useful in differential diagnosis and a positive result in an otherwise symptomless patient may also be useful in predicting the future development of a connective tissue disease.

The evidence against antinuclear antibodies having a pathogenic role in the aetiology of the connective tissue diseases is presented.

Discussion

DR. BUCHANAN (Glasgow) You mentioned that antinuclear antibody was increased in systemic sclerosis and Sjögren's syndrome, but is it not the 'speckled' type of antibody which is particularly increased?

DR. ROWELL This is a point that I thought somebody would bring up. We disagree with those who claim that the 'speckled' factor is almost exclusively confined to patients with systemic sclerosis or Raynaud's disease. In our experience both homogeneous and 'speckled' types of antinuclear factor are found in systemic sclerosis, Sjögren's syndrome, systemic lupus erythematosus, and other disorders. The type of antinuclear factor is not specific to any particular disease, although antinucleolar antibody is seen most frequently in systemic sclerosis.

DR. HILL (Stoke Mandeville) Has there been any interchange of sera with antinuclear factors between workers?

DR. ROWELL Yes. The Medical Research Council has been instrumental in circulating sera for comparison. The patterns are reproducible but sometimes the estimations of titre have differed between laboratories.

DR. GLYN (London) Have any observations been made in ankylosing spondylitis?

DR. ROWELL Not to my knowledge.

DR. BUCHANAN (Glasgow) Your criterion of positivity refers to a titre of 1 in 16. When you find this in an otherwise asymptomatic patient, what significance do you attach to it? Could you tell me how many patients had these titres and over what period of time they were followed up?

DR. ROWELL This is a highly relevant question. I cannot tell you the total numbers of patients but serial observations have been made on many for over 10 years.

Effect of Beta Particle Irradiation upon experimentally induced Chronic Inflammatory Arthritis. By F. W. S. WEBB (*Royal Postgraduate Medical School, London*)

This report concerns the effect of radiation both upon normal rabbit synovial membrane and upon rabbit synovial membrane which was the seat of a chronic inflammatory process. The uptake of the resin colloid of radioactive Yttrium (Y^{90}) by rabbit synovium has already been reported (Webb, Lowe, and Bluestone, 1969).

The arthritis was produced by the injection of ovalbumin into the knee joint of a rabbit preimmunized with the ovalbumin in complete Freund's adjuvant so as to be in a state of delayed hypersensitivity (Dumonde and Glynn, 1962). The histological changes found in this type of arthritis resemble those seen in the synovial membrane in rheumatoid arthritis in man.

In rabbits, where this chronic inflammatory process had been in progress in both knees for 4 weeks, the resin colloid of Y^{90} was then injected into one knee, and the histological changes at various intervals after irradiation were studied. Doses of radiation from 1,500 to 12,000 r were given, calculated as the average radiation dose to the maximum beta particle penetration of Y^{90} of 11 mm.

Although the changes seen between 24 hrs and 14 days showed an intense acute inflammatory response in both the inflamed and normal membrane, recovery to a near normal histological appearance occurred within 4 weeks after irradiation, and in the inflamed membrane the chronic inflammatory process disappeared.

References

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 DUMONDE, D. C., and GLYNN, L. E. (1962) *Brit. J. exp. Path.*, **43**, 373 (The production of arthritis in rabbits by an immunological reaction to fibrin.)
 WEBB, F. W. S., LOWE, J., and BLUESTONE, R. H. (1969) *Ann. rheum. Dis.*, **28**. (Uptake of colloidal radioactive yttrium by synovial membrane.)

Discussion

DR. GARDNER (London) How much radioactive material was deposited in the regional lymph nodes?

DR. WEBB We could detect none by thin window Geiger tube scanning over the rabbit's spleen, liver, or groin lymph nodes. We have not done any autoradiographs of regional lymph nodes.

DR. HILL (Stoke Mandeville) When gold was used in a similar way it was found at some distance from the joint.

DR. WEBB Reports from Finland (Birkkunen, Krusius, and Heiskau, 1967) show that colloidal radioactive gold diffuses from injected joints.

DR. HILL (Stoke Mandeville) Is yttrium better?

DR. WEBB There are no small particles, *i.e.* below 160 Å diameter, with the resin colloid of Y^{90} . Colloidal gold preparations used so far have a proportion of much smaller particles, which may explain the diffusion.

DR. SCOTT (London) We have scanned a number of patients receiving radioactive gold into one joint. There has been a small amount of radiation from iliac and para-aortic glands, and in one or two from the liver. I do not know how yttrium compares in the same situation.

DR. WYKEHAM BALME (London) I have been informed by my radiotherapy colleagues that the easiest way of inducing sarcoma is to irradiate the tissue after having inflamed it.

DR. WEBB I have not heard of this. It is certainly a possibility.