the right-hand side in a right-handed man, suggesting some correlation with use. In general, therefore, it may be that minor trauma, causing increase in vascular permeability, is a localizing factor, not only in relation to skin lesions, but possibly in relation to joint lesions also.

DR. GOLDING: I do not think that the skin lesions were, in fact, more severe on the right than on the left side.

Free Immunoglobulin Light Chains in Connective Tissue Diseases. By R. BLUESTONE and A. COOPER (*Royal Postgraduate Medical School, London*): This article and the discussion thereon is to be published in the next issue of the *Annals* (November, 1968).

Extensor Expansion in the Rheumatoid Hand. By K. M. BACKHOUSE (*Charing Cross Hospital Medical School, London*): The digital extensor expansion is a complicated tendon of insertion not only of the long extensor muscle but also of the two interossei and the single lumbrical. Through this system metacarpophalangeal and interphalangeal extension are brought about together with metacarpophalangeal flexion and ulnar or radial deviation and rotation.

Under normal conditions ulnar deviation and rotation (*i.e.* digital opposition) occurs in a high proportion of metacarpophalangeal flexor activities in the hand, whereas pure flexion or flexion with radial deviation are much less used. This functional asymmetry is reflected in the morphology of the extensor expansion and also in the way in which synovial swelling in rheumatoid arthritis disrupts the system.

Discussion.—DR. J. BALL (*Manchester*): When you speak of herniation do you mean herniation or do you really mean expansion (or distension) of the extensor expansion?

DR. BACKHOUSE: The expansion tends to stretch and becomes thin and the synovium bulges through at the weakest point. I use the term herniation merely as a figure of speech, but I think it behaves very much in the way a hernia does, pushing the walls of the developed sac ahead of it.

Development of an Artificial Finger Joint for Rheumatoid Arthritis. By J. S. CALNAN, N. D. REIS, E. G. L. BYWATERS, and P. J. L. HOLT (*Royal Postgraduate Medical School, London*): The need for replacement of joints of the hand in rheumatoid arthritis, and the requirements of such a joint, were discussed. The stages in the development of a suitable joint, the methods of sectioning bone and fixation of the joint, and the tissue acceptability of the materials used were described.

Eighteen artificial joints replacing the natural metatarsophalangeal joints in a series of dogs were observed for periods of up to 6 months. All joints were assessed by function, serial radiography, naked eye dissection *post mortem*, and histological changes in bone.

The results of this experimental study indicate that a clinical assessment of similar joints in man would be justified.

Discussion.—PROF. BYWATERS: One is encouraged to think that in our patients with replaced joints there will be no recurrence of disease, since you cannot have arthritis in a jointless joint. This opens up a big field for speculation.

PROF. J. H. KELLGREN (*Manchester*): What sort of force is required to flex these integral hinge joints?

MR. CALNAN: It is extremely slight, although we have not measured it. None of our patients had any difficulty in flexing and straightening.

PROF. J. H. KELLGREN (*Manchester*): So they would be quite suitable for the finest type of movement?

MR. CALNAN: Yes.

DR. K. M. BACKHOUSE (*London*): How much lateral movement have you in the joint postoperatively? Are you utilizing the artificial joint itself to maintain lateral stability, or do you in fact rely on the short muscles for this control in much the same way as one has to in a Fowler type excision arthroplasty?

MR. CALNAN: There is some lateral movement in the joint itself because the integral hinge part can be laterally flexed, and so therefore they can rotate; and in fact we have one patient who can rotate very well. I imagine that we must be relying to some extent on muscle balance. Certainly, we try to restore this to a reasonable degree after excision of the metacarpophalangeal joint, by correct repositioning of the extensor tendon and by doing a Littler release of the intrinsic muscles if that is indicated.

Arthritis of the Hip Joint in Paget's Disease, and Treatment by Osteotomy. By J. R. PEARSON (*Birmingham*): A study has been made of 145 patients with Paget's disease of the pelvis involving the hip joint; the series was divided into three groups depending on the degree of hip joint involvement. In seven patients who had pain arising from the hip joint an intertrochanteric osteotomy was able to relieve the symptoms.

Discussion.—DR. O. SAVAGE (*London*): Does this operation improve night pain, which is often the most important symptom in Paget's disease of the hip?

MR. PEARSON: Yes, it does.

C^{14} Studies of Uric Acid Turnover. By J. T. SCOTT, R. ARNOT, H. I. GLASS, and V. P. HOLLOWAY (*Royal Postgraduate Medical School, London*): Labelled uric acid can be used to estimate the pool size and turnover rate of uric acid in man. These values are normally calculated from the curve obtained by plotting uric acid specific activity in the urine against time. In some subjects with gout these lines are not straight when plotted on semi-logarithmic paper, indicating a two-compartment system of the miscible uric acid pool.

Treatment with allopurinol has been shown not only to reduce pool size and turnover rate but also to alter the pattern of compartment systems. In the absence of severe renal failure, uric acid turnover is fairly closely reflected by the level of urinary uric acid and pool size by the serum level.

Discussion.—PROF. E. G. L. BYWATERS (*Taplow*): Would Dr. Scott comment on the apparent decrease in turnover rate in one patient *after* allopurinol treatment: did he mean that this was during allopurinol treatment and that this decrease in turnover rates was due to allopurinol?

DR. SCOTT: The second study in the patient taking allopurinol was carried out while he was taking the drug—about 6 months after starting. Associated with the fall in plasma and urinary uric acid caused by xanthine oxidase inhibition there was a reduction in the exchangeable pool size and daily turn-over rate of uric acid. The pattern of decline in urinary specific activity now indicated the presence of a single-compartment rather than the two-compartment system before treatment.

Influence of Gold Salts on Adjuvant Arthritis in the Rat.

By J. D. JESSOP and H. L. F. CURREY (*Departments of Physical Medicine and Rheumatology, The London Hospital*): This article and the discussion thereon is to be published in the next issue of the *Annals* (November, 1968).

Synovial Fluid and Serological Changes after Treatment in Arthritic Diseases.

By N. WILLIAMSON and P. J. L. HOLT (*Rheumatism Research Wing, Department of Experimental Pathology, University of Birmingham*): 156 synovial fluid samples were collected from 48 patients suffering from various types of arthritic diseases, and 72 serum samples were also collected from thirty of these patients. These fluids and sera were examined and a comparison made of samples taken before and after treatment.

Indomethacin was used either alone or in combination with other drugs in 26 of the 48 patients; 24 received aspirin at some time during the study and because of its wide usage before admission to hospital the effects of this drug were difficult to assess. Systemic steroids were used in eight cases, intra-articular injection of steroids in five, phenylbutazone in two, and Biogastone in one.

Changes in synovial fluid cell cytology and in serology were observed after treatment. Neither synovial fluid cell count nor differential count showed any significant change with treatment; however, the staining reactions of cell smears showed marked differences. These differences were best seen with the PAS stain, there being marked diminution of staining following treatment. Similar results were obtained using enzyme histochemical techniques to demonstrate the lysosomal enzymes such as acid phosphatase and N-acetyl- β -glucosaminidase.

Serologically seven of thirty patients showed positive anti-nuclear factor, eighteen showed positive reticulin antibody, and five demonstrated a positive smooth muscle antibody. Changes in antinuclear factor staining were seen after treatment in three cases, and changes were seen in four out of five patients with a positive smooth muscle antibody. Little change was observed with the reticulin antibody.

Discussion.—DR. J. J. R. DUTHIE (*Edinburgh*): People should not be unwilling to have a joint aspirated two or three times, as long as you don't hurt them.

DR. D. N. GOLDING (*Harlow*): I was interested to hear the results of PAS staining in patients having indomethacin. This isn't a drug which everyone would agree has an important anti-inflammatory effect in rheumatoid disease. Have your figures concerning PAS-staining in indomethacin-treated patients been subjected to statistical analysis and, if so, are they significant?

DR. WILLIAMSON: No, they have not been subjected to statistical analysis. It may be necessary to increase the number of patients studied to reach a definite conclusion, but from the results so far, *i.e.* a decreased staining in twelve of twenty cases treated with indomethacin compared with none from ten cases treated with rest in bed, it will, I think, prove to be significant.

DR. J. BALL (*Manchester*): It is customary when discussing the PAS, as you must well know, to consider at least two controls, one for glycogen and another for oxidized lipid. I suppose that you have done these. Would you like, for the record, to tell us what the results were?

DR. WILLIAMSON: Control staining has been done. It does not appear to bear much relation to the changes observed. I do not feel that alterations in glycogen or oxidized lipid are related to the changes seen before and after treatment.

PROF. E. G. L. BYWATERS (*Taplow*): Might I perhaps ask if the authors studied the effect of indomethacin *in vitro* on synovial fluid cells or if they have any indication as to how early a detectable change comes in? I think all your figures referred to changes at 7 days only.

DR. WILLIAMSON: As far as changes are concerned we have no evidence that anything occurred earlier than one week. This was an arbitrary time chosen for the first synovial fluid aspiration. We have not studied the effects of indomethacin on synovial fluid cells *in vitro*. Dr. P. Weston, in our laboratory, has studied the effects of indomethacin *in vitro* on synovial hyaluronidase but has been unable to show any diminution in the activity of this enzyme on hyaluronic acid. We need to do more work on this aspect to establish whether treatment inhibits the action or production of the hyaluronidase *in vivo* to fit with the hypothesis I made earlier.

DR. W. R. M. ALEXANDER (*Edinburgh*): Is it possible that indomethacin, in some purely chemical way, interferes with the PAS-staining reaction without necessarily having any biological effect?

DR. WILLIAMSON: This is a possibility, but against this we have obtained similar results with both aspirin and intra-articular steroids. Also four of the twenty cases on indomethacin showed an increase in staining after therapy, which would not be expected if the action was purely chemical. Perhaps the main factor in support of a biological effect is that the patients who showed diminished staining were the ones who responded well to therapy, whereas the patients showing increased staining all demonstrated some worsening of their condition.

DR. T. M. CHALMERS (*Manchester*): I should like to ask whether you had any evidence of quantitative changes in enzyme activity in synovial fluid before and after treatment?

DR. WILLIAMSON: We attempted to estimate both acid phosphatase and N-acetyl- β -glucosaminidase in synovial