Stiffness of the Knee in Normal and Osteoarthrosis Subjects, by R. GODDARD, D. DOWSON, M. D. LONGFIELD, V. WRIGHT (*Leeds*).

Radio-isotope Studies of Rheumatoid Knees before and after Synovectomy, by A. KAY, A. KATES, E. N. COOMES, C. B. CAMERON, E. CHANDLER (*London*).

Athetoid Movements in Cervical Spondylosis, by E. R. BICKERSTAFF (*Birmingham*).

Hypospray Treatment of Tennis Elbow, by G. R. HUGHES, H. L. F. CURREY (*London*) (*Annals*, 28, 58).

Thyroid Disorders presenting with Musculoskeletal Symptoms, by D. GOLDING (*Harlow*).

Rheumatic Disease in Patients suffering from Scleral Disease, by P. FOWLER (*Manchester*).

Assessment of the Anti-Inflammatory Effect of Intra-Articular Steroids by Means of External Temperature Measurements, by F. LLOYD WILLIAMS, F. J. RING, J. A. COSH (*Bath*).

In vivo Observations on the Tensile Properties of Human Skin, by R. GRAHAME, R. BLUESTONE, P. J. L. HOLT (*London*).

Clinical Meeting

At the Annual General Meeting on November 22 and 23, 1968, the following papers were given:

Tendon Involvement in Rheumatoid Arthritis. By K. M. BACKHOUSE, A. KAY, A. KATES and E. N. COOMES (*St. Mary Abbots and St. Stephen's Hospitals*): Tenosynovitis is one of the common features of rheumatoid arthritis in the hand. It affects both the extensor and flexor tendons, sometimes leading to granulomatous involvement and tendon rupture. The commonest sites of rupture are well known but the areas of more general tendon involvement are less understood.

More frequent surgical intervention early in the disease has increased the opportunity in recent years to analyse the sites of tendon involvement. These sites and also of the much more occasional rupture were examined and plotted in eighty hands (48 flexor and 32 extensor tendons). The tendons most involved were found to conform to a fairly constant pattern. This indicated a correlation between disease activity, the functional roles of the tendons concerned, and the possible stresses which might be relevant to the changes. For example, in the palm, the flexor digitorum profundus is always far more involved than the flexor digitorum sublimis and this corresponds with the relative use of these muscles and tendons in everyday activity.

Discussion.—In reply to a question by DR. J. BALL (*Manchester*), MR. BACKHOUSE stated that it was well known that loss of blood supply had been suggested as a cause of tendon rupture. He thought, however, that in many cases it was simply a question of the tendon becoming weaker, stretching, and breaking.

DR. J. BALL (*Manchester*) said that, in the hand, when looking at the end of a ruptured tendon, he had been

struck by the paucity of granulation tissue. This might be against the hypothesis that the inflammatory granulation tissue, with which the tendon bundles were surrounded, was responsible for the rupture.

PROF. E. G. L. BYWATERS (*Taplow*) said that he had sometimes seen transformation of a tendon into a necrotic rheumatoid nodule. In these circumstances the tendon would be weakened very considerably and, if rupture occurred, the necrotic ends should be recognizable.

DR. J. BALL (*Manchester*) said that a certain amount of necrosis would occur simply because of the trauma to which the ruptured end of the tendon was put. It was not possible to distinguish between necrosis of granulation tissue and of the ruptured tendon.

The Hip Joint in Ankylosing Spondylitis. By E. N. GLICK (*London*): The features found in a retrospective study of 240 cases of spondylitis in which details of the hip joints were available were analysed. Abnormalities were found in approximately one-third but these were commonly mild. The changes found were described, particularly in reference to radiological abnormalities. Classical bony ankylosis was found in only 12 per cent. of the affected hip joints. Changes undistinguishable from rheumatoid arthritis were seen in 6 per cent.

It was suggested that the most frequent abnormality was a "ruff" of new bone formation around the femoral head.

A 5-year Follow-up of Fifty Cases of Idiopathic Osteoarthritis of the Hip. By M. H. SEIFERT, C. G. WHITESIDE, and O. SAVAGE (*London*): Patients with primary osteoarthritis of the hip were admitted to a prospective study of this disease initiated in 1961 in the department of Rheumatology and Physical Medicine at the Middlesex Hospital.

After 5 years, 125 patients had been seen. Of these 42 were lost to follow up mainly because of their advanced years (75 per cent. being 65 years or over). This left 83 of which 39 came to surgery and were assumed to have deteriorated.

The study was carried out on the remaining 44 to find what parameters of measurement were of value in the 5-year follow up, after being checked each year with x rays and special measurements. It was found that the only useful parameters in the series were night pain, time for stairs, and radiology. Eighteen of 44 patients who were finally left in the series showed an increase in time of more than two seconds for ascending and descending a flight of stairs, and of these twelve had complained of night pain when first seen.

Radiologically it was found that those who initially presented with cystic changes, fared worse after 5 years of follow-up, suggesting that when no cysts were seen in the initial x ray the prognosis was better.

Obesity was found to have no influence on prognosis in the series, as 60 per cent. of the patients were less than 7 lb. over their ideal weight for height and age, and there was no correlation between deterioration and excess of weight.

It was shown that 68 per cent. of the patients left in the trial had deteriorated after 5 years; *i.e.* eighteen patients needed increased time for stairs and 39 required surgery. 32 per cent. of patients had shown no deterioration in any way which could be measured.

Finally, it was suggested that all patients with primary osteoarthritis of the hips did not inevitably deteriorate, although those with radiological cysts when first seen were more likely to do so and might be suitable for surgery at an early stage.

Discussion.—DR. G. HOLDEN (*Crawley, Sussex*) asked if there was any relationship between the rate of deterioration of the hips and the previous occupations of patients. Mr. Seifert replied that no such correlation had been found.

Following a discussion on the apparent recovery of joint space in a number of patients in Mr. SEIFERT's study, DR. A. ST. J. DIXON (*Bath*) made the point that it was essential to standardize radiographs by ensuring that the patient was weight-bearing and that the foot was rotated to the same extent on each occasion.

DR. L. J. BARFORD (*London*) was encouraged by the evidence that a number of cases of osteoarthritis of the hip improved clinically, but DR. SAVAGE stressed that in this series a more important finding was that one-third of the patients did not deteriorate.

Pressure Studies in the Moving Knee. By M. I. V. JAYSON and A. ST. J. DIXON (*Bath*): Intra-articular pressure recordings were made by passing catheters into knee joints and connecting these with transducers.

Pressures were recorded with varying amounts of simulated effusions during a variety of manoeuvres.

The results of these readings were presented with a discussion of their relevance to the effects of effusion in patients with arthritis.

Effects of External Environmental Changes on the Viscosity of Human Synovial Fluid. By J. F. BUCHAN and M. P. RIGBY (*Royal Northern Hospital, London*): Synovial fluid is usually regarded as a time independent non-newtonian fluid. Both prolonged agitation and prolonged cooling of sterile centrifuged human pathological fluid have no effect on the viscosity as estimated by the Frame and Wier Viscometers. However, prolonged gentle heat under controlled conditions initially raises the viscosity and later reduces it. The causation for these changes and their significance was discussed.

Behaviour of Synovial Fluid on Articular Cartilage. By P. S. WALKER, J. SIKORSKI, D. DOWSON, D. LONGFIELD, and V. WRIGHT (*Bio-engineering Group for the Study of Human Joints, Rheumatism Research Unit, and*

Department of Mechanical Engineering, University of Leeds): It had previously been shown that in load-bearing joints, such as the hip and knee, the cartilage surfaces were protected by a fluid film which was maintained by a squeeze-film action. Even under prolonged loading the fluid took a long time to squeeze out from between the surfaces and large areas of boundary contact were prevented from forming. This action depended upon a combination of the properties of synovial fluid and of the surface of articular cartilage. Some of these special properties as revealed by scanning electron microscopy and other techniques were described.

The outlines of small agglomerations of hyaluronic acid-protein complexes were visualised and evidence was presented to show their entanglement with each other to form a network.

The undulating nature of the surface of cartilage was shown by a stylus tracing method and by scanning electron microscopy.

When two such surfaces are loaded together a large array of "trapped pools" is enclosed. Evidence was presented to support this concept of boosted lubrication by fluid entrapment. A stylus measuring method had been used to assess the degree of surface flattening at different loadings and after different times under load.

Scanning electron micrographs of osteoarthrotic cartilage were shown to give information about the wear mechanism in these joints.

Discussion.—PROF. K. W. WALTON (*Birmingham*) referring to Mr. Longfield's paper, suggested that the electron-microscopic appearances on the surface of the cartilage might reflect the shape of the hyaluronic molecules or their polymers. He also pointed out that artefacts were liable to be produced during the preparation of specimens for the scanning electron microscope.

PROF. E. G. L. BYWATERS (*Taplow*) suggested that this criticism might be met by looking at impressions of the original specimens.

PROF. J. H. KELLGREN (*Manchester*) asked Mr. Longfield if he had studied other materials with the same sort of undulating surface and roughly the same elastic properties as cartilage, to establish whether it was the surface and elasticity of the material or some chemical property of the cartilage surface which caused entrapment.

MR. LONGFIELD replied that from the results of experiments using a rubber replica it was probable that entrapment was due to some chemical or other property of the surface of the cartilage.

DR. G. NUKI (*Glasgow*), in discussing the paper of Drs. Buchan and Rigby, suggested that there was a gradual decrease in viscosity of synovial fluid with rise in temperature. This was much accentuated when the fluid was incubated at body temperature for two days. He thought that the explanation of this phenomenon was degradation of hyaluronic acid by enzymes contained in the fluid.