($3{\cdot}2 \times 10^{-7}$ and $3{\cdot}1 \times 10^{-7}$ mole/gm., respectively). The volume of nitrogen evolved, V, for a sample without dislocations (obtained by annealing at temperatures higher than T_D) is the sum of (i), (ii) and (iii), and the decrease in V on removing copper from the solution is the sum of (iii) and (iv) when reduced to the initial concentration of the solution, hence each value can be obtained separately. For example, (i) is 4·6, (ii) 1·5, (iii) 1·6 and (iv) 8·3 c.c. for samples annealed below T_D as shown in Fig. 2, (ii) as well as (iii) being almost constant irrespective of the annealing temperature.

In the case of nickel, the catalytic activity for the hydrogenation of ethylene is greatly enhanced by rolling the metal foil, but this effect is eliminated by annealing at a temperature between 200° and 300° (ref. 3). From the results of annealing experiments for deformed nickel[1,4], the evolution of energy and the change of physical properties between 90° and 320° and those between 520° and 660° were concluded to be due to the disappearance of vacancies and dislocations, respectively. Consequently, the greater proportion of the enhanced activity found by us may be attributed to point defects at the surface formed by cold-working (although the value of T_D may not be exactly the same as that with vacancies in the bulk crystal), contrary to Cratly and Granato's postulate[5] ascribing the activity to dislocations. By means of the method described, we hope to obtain some knowledge of the physical nature of the active centres in metallic catalysts.

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BIOCHEMISTRY

Polysaccharide Content of the Prolapsed Nucleus Pulposus of the Human Intervertebral Disk

The nucleus pulposus of normal human intervertebral disk contains the two acidic mucopolysaccharides, chondroitin sulphate and keratosulphate[1–3]. During ageing an increase of collagen occurs[4] leading to a decreased ratio of mucopolysaccharide to collagen, although the absolute amount of mucopolysaccharide remains constant[4].

A recent paper by Hendry[5] has shown that the prolapsed nucleus pulposus is in fact relatively desiccated *in situ*. He postulated that this was due to a loss or deterioration of the protein–polysaccharide complexes present. We have analysed a series of nuclei pulposi, from prolapsed disks, for ester-sulphate and have found that without exception these contain very low amounts compared with our measured normal specimens.

The values obtained for the prolapsed nuclei pulposi are considerably lower (in most cases less than half) than values in the literature for the normal nucleus. The decrease in ester-sulphate content on ageing shown in Table 1 is apparent rather than absolute, due to increase of collagen increasing the total percentage dry weight. It is unlikely that all these low ester-sulphate values are only due to an abnormal increase in the collagen content of the nucleus; in fact, percentage dry weights of up to 75 per cent would be required to explain these values. It seems more likely that a genuine decrease in the absolute quantity of mucopolysaccharides has occurred before or during prolapse.

Table 1. Ester-Sulphate Analyses of Prolapsed Human Nucleus Pulposi at Various Ages

Age (yr.)	Ester-sulphate sulphur as percentage of dry weight
18 *f*	1·1
19 *f*	1·2
26 *m*	1·0
39 *m*	1·0
49 *m*	0·6
53 *f*	0·6

m, Male; *f*, female (free sulphate in all cases was found to be negligible).

It is seen that these results appear to favour Hendry's theory of relative dehydration of the nucleus leading to prolapse. An alternative hypothesis arises which involves the possibility that the normal deposition of collagen fibrils, which with age tends to make an intervertebral disk more rigid and less likely to prolapse, might not occur so completely with a genuine deficiency of mucopolysaccharide, thus allowing the nucleus pulposus to remain a relatively unstrengthened gel. Such a disk would then be the one more liable to prolapse than a normal disk of the same age group. The possibility arises that the mucopolysaccharides in the surrounding annulus fibrosus may also be reduced, giving rise to more friable wall structure.

The cause of the loss in acidic mucopolysaccharides is unknown, although it is of interest that we have found that all samples of nuclei pulposi contain a hitherto unreported free monosubstituted guanidine compound (Sakaguchi test and electrophoretic isolation).

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Metabolism of Propionate by Homogenates of Normal Sheep Liver

Propionic acid, one of the major products of cellulose fermentation in the ruminant stomach, is of unique importance in the carbohydrate economy of the sheep[1], in addition to its presumed function as a direct source of energy. Following injection of propionate into the blood-stream of a fasting sheep, there may be observed both a sharp rise in blood