Kronig arrives at two results for the perturbations according as the quantum number n which determines the angular momentum of the electrons about the nuclear axis changes by ± 1 or remains constant in the radiationless transition. In the first case the width of the rotation line varies with the square of the quantum number j , which determines the total angular momentum. In the second case the width of the line is independent of j . Kronig has made rough estimates of the orders of magnitude of the perturbations. Using his estimates, we cannot account for the observed width of the lines of higher rotational quantum number unless we take the first case in which n changes by ± 1 and the width is therefore proportional to j^2 . We have reason to believe, however, that n has the same value for group Cl* as for group I*.

It is possible, however, to account for the magnitude of the effect, even in this case, if we take into account the fact that the eigenfunctions are oscillating functions of the co-ordinates. We have made calculations, using Kronig's estimate for the electronic eigenfunctions and making very reasonable assumptions as to the nature of the vibrational eigenfunctions of the two states. The vibrational eigenfunctions are approximately sine curves. It is entirely consistent with what we know of the energy and moment of inertia of the molecule in its two states to suppose that the eigenfunctions have nearly the same wave-length and such a phase relationship as to produce a large effect. The calculations show that perturbations of the type considered by Kronig are then sufficient to account for the observed widths. The effect would be still further enhanced if the electronic eigenfunctions of the two states should coincide in a similar manner, in which case a less complete coincidence for the vibrational eigenfunctions would be sufficient to reproduce the experimental values.

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Effect of Parathyroid Hormone on the Structure of Bone.

In the current issue of the *Journal of Experimental Medicine* (January 1929), Bauer, Aub, and Albright have reported that the administration of the parathyroid hormone (Parathormone, Eli Lilly), to rabbits over a period of 91 days in doses up to 8 units per diem results in a depletion of the trabeculae of bone, without gross changes in the cortex. The X-ray plates showed that the bones contained less calcium than those of control animals belonging to the same litter, whilst the blood calcium increased to about 15 mgm. per cent as compared with a normal value of 10 mgm. per cent. In similar experiments with young rats the administration of parathormone did not give a similar result, but rather increased the number of trabeculae and the density of the bones, whilst the blood calcium did not differ appreciably from that of untreated animals under similar conditions. With cats the results were entirely negative.

All these experiments were carried out with a diet rich in calcium.

It has for some time been recognised that the diseases osteitis fibrosa and osteomalacia are not infrequently associated with tumours or hyperplasias of the parathyroid glands. For example, parathyroid adenomata were found in the case of osteitis fibrosa described in great detail by Dawson and Struthers

(1923) in a communication from this laboratory. In another case of the same disease also associated with parathyroid adenomata, more recently investigated from the biochemical point of view by one of us (C. G. L.), a very marked hypercalcaemia (17 mgm. per 100 c.c.) was found, together with a negative calcium balance (see Lambie, *Brit. Med. Jour.*, 1927). It appeared possible that in these cases the primary disturbance was the existence of the parathyroid tumour resulting in an excess production of the hormone over a long period. This would cause the hypercalcaemia, the negative calcium balance, and, presumably, the removal of calcium from the bones.

In order to test this hypothesis it was thought desirable to carry out experiments to ascertain what is in fact the effect of prolonged administration of parathyroid hormone upon the structure or bones. In preliminary experiments carried out with young growing rats, kept on an ordinary diet, in which two were used as controls and two were given 10 units each of parathormone per diem for 21 days, it was found, on histological examination of the bones, that there was marked thinning of the trabeculae in all the bones examined, especially the femora and vertebrae. In one of the two treated animals changes were also apparent in the cortex and in the epiphyseal cartilages. The bones, when dried, exhibited a greater tendency to fracture than did normal ones, and when ground up showed themselves to be more fibrous in texture. On chemical analysis it was found that the bones of the treated animals gave rise to less ash on ignition, but that the percentage of calcium in the whole bones was not significantly altered. It appears, therefore, that the inorganic ash from the treated animals actually contained more calcium than that of the untreated. This latter finding is puzzling, but may indicate a change in the form in which calcium exists in the bones of the treated animals.

These results confirm the positive findings of Bauer, Aub, and Albright as to the effect of parathyroid hormone upon the structure of bone, and it is hoped that by further experiments on these lines light may be thrown upon the pathogenesis of osteitis fibrosa, osteomalacia, and other bone dystrophies.

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Spiral Markings on Carborundum Crystals.

In the course of another investigation, we have had occasion to examine crystals of carborundum under the microscope. These crystals were of very dark purplish colour, with often a greenish sheen. Pure carborundum is said to show little colour, and the deep colour of the crystals of commerce is attributed to a minute quantity of free carbon, which doubtless tends to distort the lattice. Certain of our crystals exhibited, on their smooth hexagonal, basal pinakoid, surfaces, striations formed of numerous curved parallel lines, some thirty or forty microns apart, and roughly equidistant. Such striations have been mentioned in the literature. We were fortunate in finding a crystal face which showed that these markings may form a rather perfect spiral. A photomicrograph of this is reproduced as Fig. 1.