Chapter XLV.

Summary.
The scales of fresh water fishes of Kashmir studied in the present investigations are of Cycloid type. The scale formula along the lateral line, between dorsal fin and lateral line and pelvic fin and lateral line differs in different fishes.

The radii are completely lacking in the scales of Salmo; present in anterior and posterior fields only in Schizothorax, Crossochilus and Cyprinus whereas they are present in all the fields in Oreinus. by Scales

The fact that the age determination is not possible in fresh water fishes of tropical countries is now a myth as demonstrated by Das (1958, 1962 and 1964) has been amply substantiated in the present thesis.

The annuli are clearly seen on scales, Otoliths, Opercular bone and vertebral sections of the fishes studied in the present investigations for the first time in India.

The annuli on scales are seen in the form of discontinuation of circuli, cutting over of circuli, approximation of circuli or in the form of thin clear streaks.

The annuli on otoliths are found as opaque/translucent bands, whereas annuli on opercular bone are seen in the form of thick grooved dark lines or as thin lines.

The vertebrae show annuli in the form of thick, dark, double bands or as thick double lines, which have been shown here for the first time by the author.
Double concentric bands on scales have been seen, though more prominent in *Cyprinus carpio* scales only. These bands each of summer and winter season constitute one annual zone after which lies the annulus.

False annuli on scales, otoliths, opercular bone and the vertebrae were seen clearly. Their flase nature was confound when these are patchy, broken, incomplete seen only at some places of the concerned structures and disappear by differential focussing.

The rate of feeding differs at different times in a year as is clear from the contrast in the width of the annular zones and the intervening bands.

Not only the rate of feeding, but the periods of 'good feeding', 'bad feeding' and cessation in feeding clearly show that these fishes do not have a uniform growth rate.

Scale-annuli, fish-length of different year classes has been determined mathematically and the results compare well with the actual recorded lengths. The 'error' between the two has been found to be comparatively low and as such negligible. The simplest formula used in these calculations is \( l = \frac{L \times d}{D} \), were the diameter of the annulus is taken into consideration.

The length of the fish when plotted against weight of the fish gives a curve, which shows the possibility of relationship, as apparently showing that with advanced age and
increase in length the weight of the fish does not have a straight line relationship. The values being highest at a particular age, which is different for six species. The

The experimental studies on some fishes have shown that temperature being the same the variations in food are clearly reflected on scales as is clear from narrowing or widening of circuli.

The present work clearly shows that the entire life history of a fish is recognizable as a result of studies on the scales, otoliths, opercula and vertebrae of fresh water fishes of Kashmir study for the first time in the present investigations.