

More definite data are given on the number of pyloric caeca by McGregor (1923, per Ricker, 1959). The counts appear to have been made on mature fish trapped on their spawning migration, and to be directly comparable with the New Zealand figures presented herewith.

TABLE 3.—NUMBER OF PYLORIC CAECA.

Locality	Minimum	Maximum	Mean
Sacramento	134	214	176
Klamath	93	193	133.2
New Zealand	135	218	172.5

This is the first evidence of affinity of the New Zealand fish with the Sacramento stock. The numbers agree as closely as would be expected if two such groups had been taken from a single locality. The number of caeca appears to be one of the characters least affected by influences such as environment and age in various salmonoids that have been investigated. The group of 30 quinnat smolts from the Waimakariri River, already referred to in the present paper, had an average of 173.5 caeca, which comes within one of the average for adult fish.

About 1957 a decline in the size and growth rate of quinnat occurred. When this became evident it was noticed that the number of anal fin rays of the few fish examined intact was below normal. In 1961 it was possible to examine 28 specimens taken at the Rakaia, and to compare the results with records of 20 specimens counted from 1927 to 1949. Counting only developed rays (all the branched rays plus one simple ray) the averages were 15.5 for the 1927-49 collection and 15 for 1961. The difference is not great but assumes some significance when the frequency with which the different numbers occur is considered. This is shown in Table 4.

TABLE 4.—FREQUENCY DISTRIBUTION OF DEVELOPED RAYS IN ANAL FIN.

Date	Number of Specimens	Number of Rays					
		12	13	14	15	16	17
1927-49	20		1	1	8	7	3
1961	28	1		5	15	6	1

Whereas the numbers 15 and 16 are almost equally distributed in the 1927-49 collection there is a definite peak at 15 in the 1961 group. Seymour (1959, per Ricker, 1959) in the experiment mentioned when dealing with vertebrae, found that the number of anal fin rays was greatest in fish hatched at normal temperatures and lower in fish hatched at higher and lower temperatures. While the number of vertebrae was increased by extreme temperatures and the number of anal fin rays was reduced, the significant circumstance is that, in each character a change in either direction produced the same result. This change appears to be merely a reaction to unsuitable conditions analogous to that which sometimes precedes the extinction of an organism. It is quite likely that changes of the same nature would be brought about by other detrimental influences such as unsuitable chemical constitution of the hatching water, or deteriorated condition of the parent fish.