

It is a more or less common observation that dace and trout occur together in many streams in areas where the surrounding land has been cleared or partly so. This, no doubt, means that the ranges in environmental factors of the two species overlap. The situation in the lakes in Quebec can only be a matter of supposition at the present time, but it is not improbable that deforestation has brought about a change in conditions, probably chiefly in temperature, so that environmental factors have become more favourable for dace and less so for trout, with resulting increase in numbers of the former and decrease of the latter. Food competition may be a secondary factor.

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A DESCRIPTION OF *LEUCICHTHYS TULLIBEE*  
(RICHARDSON) BASED ON SIX SPECIMENS  
FROM THE TYPE LOCALITY

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The name "tullibee" which Richardson (1836) applied to the freshwater herring (*Leucichthys*) of Pine Island lake in northern Saskatchewan has been very generally used to designate the lake herrings of the Nelson and Saskatchewan river drainage areas and also the larger forms of the genus in the Great Lakes. From the Great Lakes northwestward throughout Canada, this term (variously pronounced tullibee, toolibee, toolipee, etc.) has been used as the common name of a variety of these forms. Where several species of the genus occur in the same body of water, as in Lake Nipigon, the largest form is locally called tullibee.

Heretofore the use of Richardson's name for any of these forms has not been warranted for the reason that his description is not satisfactory, and no type specimen or topotypes have been available for examination. Through the co-operation of the Hudson's Bay Company I have recently secured from Mr. H. M. S. Cotter, Factor of the Hudson's Bay Company at Cumberland House, Pine Island lake, six specimens of tullibeas. These were taken from Pine Island lake, from which Richardson obtained the specimens from the examination of which he drew up his description of *Salmo* (*Coregonus*) *tullibee* in the winter of 1819-20.

The specimens which Mr. Cotter obtained for me were taken in the winter of 1926-27. They were shipped frozen and reached me in good condition, except that the fins were badly broken. They were preserved temporarily in a 5% solution of formaldehyde, being later transferred to a 65%



solution of alcohol. They were measured after several weeks' preservation in the latter, the method followed being that described in my paper on *The Fishes of Lake Nipigon* (Dymond 1926, p. 29).

The specimens ranged from  $12\frac{7}{8}$  to  $15\frac{3}{4}$  inches in length. The body in the larger ones is quite deep and only moderately compressed. Even in the largest examples there is no specially distinct nuchal hump, but the dorsal contour rises in a fairly even curve from the snout to the dorsal insertion. The width is contained 6.2 (5.7-6.6) in the body length; depth 3.4 (3.1-3.7); head moderately long 4.1 (4.0-4.3). The premaxillaries make an angle of about  $35^\circ$  with the horizontal axis of the head. Eye 4.2 (4.0-4.8) in head length; snout 3.9 (3.8-4.1); interorbital 3.5 (3.3-3.8); maxillary 2.9 (2.8-3.2). The caudal peduncle is short and very deep, the depth in five of the specimens being greater than, and in the sixth equal to the length, the length 2.5 (2.2-3.1) and the depth 2.3 (2.2-2.4) in head length. Fins evidently all quite long. Dorsal fin with 11 or 12 rays (13 in one specimen), its base 1.7 in head; in all cases the fin was so broken as to make it impossible to determine its height; anal with 12 or 13 rays (11 in one specimen), its base 1.9 (1.7-2.1) in head; in the only specimen with an unbroken anal fin the height was almost equal to the base; in the only two specimens with uninjured pectorals the length was 1.3 in head and in the case of the only uninjured ventral 1.4 in head; distance from insertion of pectoral to ventral insertion 3.2 (3.0-3.3) in total length; scales 9 or 10-70 (66-76)-8 or 9; gill rakers 51 (17+31 to 18+36).

The colour of preserved specimens is quite dark above the lateral line; the lower fins show little or no black pigment, but on account of the broken condition of the fins it is difficult to be certain as to their coloration.

The following table gives comparative measurements of the six specimens. The length indicated is the actual measurement in millimetres from the tip of the snout to the end of the vertebral column. The values given for the head and other body parts, including the fins, were obtained by dividing

the actual measurement of these parts in millimetres by the body length and therefore represent thousandths of the body length. Hence they are directly comparable for the various specimens. The scale count includes the number of scales in the lateral line counting only to the end of the vertebral column.

TABLE I

COMPARATIVE MEASUREMENTS OF SIX SPECIMENS OF *Leucichthys tullibee* FROM PINE ISLAND LAKE, NORTHERN SASKATCHEWAN.

Specimen no.	3466	3467	3468	3469	3470	3471
Length	352	310	325	310	295	354
Scales	70	71	65	74	76	66?
Gill rakers	17+32	18+36	18+33	18+34	17+31	18+32
Head length	234	232	250	246	235	238
Body depth	302	271	280	276	301	325
Body width	168	161	151	158	158	175
Caudal peduncle						
Length	77	93.5	101	97	95	110
Depth	99	101	106	106	107	110
Eye	55.5	58	52	61	58	55
Snout	61	56	65	63	58	62
Interorbital	68	69	66	71	71	71
Maxillary	81	82.5	79	81	81.5	82
Snout to Occiput	162	161	161	169	163	162
Pectoral to Ventral	321	312	298	314	337	300
Pectoral length	..	..	..	..	175	181
Ventral length	..	..	..	..	..	177
Dorsal base	142	135	120	148	142	141
Anal height	..	..	..	..	132	..
Anal base	122	123	120	135	140	136
Adipose length	74	58	74	61.5	..	65
Head depth	160	169	166	164	162	173

It has been generally assumed that only one species of *Leucichthys* occurred in the Nelson and Saskatchewan river drainage areas and that this species was *L. tullibee* (Halkett 1909, Prince 1909 a & b, Evermann and Latimer 1910, Jordan and Evermann 1911, Skaptason 1926, Bissett 1927). Koelz (1925) has shown that the species described by him under the name *L. nipigon* occurs in Lake Winnipeg but he was unable at that time to say whether this was the form to



which Richardson had given the name *tullibee*. Examination of the specimens here described makes it evident that *L. nipigon* is quite distinct from *L. tullibee*. The Department of Biology collection of fishes includes several specimens from Manitoba which are not referable to either *L. nipigon* or *L. tullibee*, but our material is not yet sufficient to say how many species of this genus are included in the fish fauna of this area.

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### A PRELIMINARY STUDY OF THE GENUS *LEUCICHTHYS* IN THE CANADIAN WATERS OF LAKE ONTARIO

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