

supraorbital (SO) canal joining the IO canal at the dermosphenotic bone, it is convenient to include the pores anterior to this juncture in the IO canal and those posterior to it in the POC. However in most North American cyprinids the SO canal does not join the IO canal, and it is often difficult to decide whether a certain pore should be included in the IO canal or the POC. Consequently I follow Illick (1956) in including all pores anterior to the juncture of the ST canal and the POC in the count of the IO canal.

In the subgenus *Lythrurus*, only *N. ardens* has the cephalic laterosensory system fully formed in the adult stage. The system tends toward reduction in all other members of the subgenus. Reductive tendencies are expressed mainly in the development of the ST and IO canals. The SO and preoperculomandibular (POM) canals show little modification and are formed in the fashion typical of the genus (see Illick, 1956:figs. 28-30, and Reno, 1966:fig. 1).

The ST canal of all species is broadly interrupted at the dorsal midline. Incomplete development of the ST canal leaves secondary interruptions, usually between the normal positions of the first and second pores. These interruptions appear as incompletely closed pores (or slits) or open troughs. Occasionally this canal is absent on one or both sides. Reduction of the ST canal is strongest in *N. b. alegnotus* and *N. lirus*. In these two forms 52 and 60 percent respectively of the specimens examined had ST pores reduced from the typical number of 2 to 1 on one or both sides, suggesting that reductive tendencies are in the process of eliminating one pore and a portion of the canal. In other species secondary interruptions are occasional, but complete formation is the typical condition in adults.

Lekander (1949), Harrington (1955), and Swift (1970) have noted that the IO is ontogenetically the last cephalic lateral line canal to form and therefore is susceptible to retarded formation (neoteny) and other reductive tendencies. Irregularities in the presence and number of infraorbital ossicles is not uncommon. Reno (1966) demonstrated that the IO canal and some of its associated ossicles are absent in *Notropis buchmanii* Meek.

In the subgenus *Lythrurus*, any or all of infraorbital bones 2 through 4 may occasionally be incompletely formed, leaving breaks or open slits in the canal. Such interruptions usually are below the eye at the junction of IO₂ and IO₃, or behind the eye at the junction of IO₃ and IO₄. Occasionally the POC is poorly formed, disconnected from the ST and/or cephalic lateralis (CL) canals, or absent. The most characteristic feature of IO canal neoteny is reduction or absence of the dermosphenotic bone. This small canal-bearing bone, when present, lies free in the skin over