

TAXONOMY OF FISHES OF THE GENUS *SCHIZOTHORAX* HECKEL* WITH THE DESCRIPTION OF A NEW SPECIES FROM KUMAON HIMALAYAS

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I—INTRODUCTION

Recently, while studying the fish fauna of the Himalayas, considerable difficulty was experienced in identifying the various species of *Schizothorax* Heckel namely, *S. plagiostomus* Heckel, *S. richardsonii* (Gray) and *S. molesworthii* Chaudhuri and defining their respective limits of distribution. This led me to a thorough examination of the entire material of *Schizothorax* in the collection of the Zoological Survey of India. A careful morphometric and biometric study of the various closely related populations of *Schizothorax* occurring in the different drainages of the Himalayas including Afghanistan was undertaken. As a result of this study it has been possible to conclude that there are only two valid species of *Schizothorax*, including the new species, described under the name *S. kumaonensis* in this paper.

**Schizothorax plagiostomus* Heckel, characterised by a suctorial mouth is the type-species of *Schizothorax* Heckel and McClelland's *Oreinus* with *O. guttatus*, also characterised by a suctorial mouth is synonymous with *Schizothorax* Heckel. Thus the generic name *Schizothorax* should be strictly applied to only species with a suctorial mouth and all other species of the Schizothoracinae without a suctorial mouth like *S. esocinus* Heckel should be placed under *Schizothoracichthys* Misra (vide, *Rec. Indian Mus.*, 57, p. 48, 1959).

Rec. Zool. Surv. India, 63 (1-4), 1971.

II—REVIEW OF LITERATURE

Gray (1832) gave the illustration of his *Cyprinus richardsonii* without any description. No type was deposited nor any mention of the type-locality made. However, from the illustration it will be obvious that (1) the length of the head in *richardsonii* is about 4.5 times in standard length, (2) the dorsal commences slightly in advance of the root of the ventral and (3) the dorsal origin is somewhat nearer the tip of snout than the base of the caudal fin.

Heckel (1838) in his "*Fische Aus Caschmir*" described ten species of *Schizothorax* of which only two species namely, *S. plagiostomus* and *S. sinuatus* are characterised by a suctorial mouth and hence considered as *Schizothorax* sensu stricto (*vide* Misra, *loc. cit.*). From the comparison of his description of the species it would appear that Heckel distinguished the two species by the following characters :

S. plagiostomus Heckel

S. sinuatus Heckel

Dorsal serrated spine weak

Dorsal serrated spine strong.

Snout covered with tubercles

Snout smooth.

McClelland (1839) in his monograph on Indian Cyprinidae gave brief descriptions of his two new species of *Oreinus*, *O. guttatus* and *O. maculatus*. *O. guttatus* was characterised as follows : "Head covered with thick integument, branchial apertures small, side and fins irregularly marked with brown spots, scales minute" McClelland's second species, *O. maculatus* was characterised as "Mouth situated on the lower surface of the head, small shapeless spots irregularly distributed over the body but not on the fins, scales minute." In the same work McClelland gave a very brief description of *O. richardsonii* Gray. He characterised it thus : "About eleven rays in the dorsal and nine in the anal, back, speckled with minute dots"

In his account of the fishes of Afghanistan in Griffith's collection McClelland (1842) recorded specimens of the genus *Oreinus* from the head of the Ali Musjid stream (Khyber Pass), Kabur River, Gandamak, Pashat and Girdun Dewar. The specimens from Helmand river (Girdun Dewar) were referred to *O. plagiostomus* Heckel, while those of Pashat (Kunar River) were described as *O. griffithii*. The young specimens collected from Kabul River, Ali Musjid stream and Gandamak were referred to *O. maculatus*. *O. griffithii* was characterised by McClelland as follows : "The breadth of the mouth is equal to half the length of head, and of the interval from the extremity of the snout to the commencement of the pectorals. Dorsal spine large, vertical scales at the anal obsolete, posterior margin of the operculum round, snout smooth in D, 4/8 : P. 20 : V II. A 1/6.C.19. The intestines are six length of the body, and contain a brownish pulp. The species although perfectly distinct, differs but little in appearance from *Oreinus plagiostomus*" *S. plagiostomus*, *S. sinuatus*, *Oreinus richardsonii* and *O. maculatus* are again briefly described by Valenciennes (1842).

Heckel (1844) published *Fische Kaschmir's* in Von Huegel's *Kaschmir und Das Reich Der Seik* and gave descriptions of *Schizothorax plagiostomus* and *S. sinuatus*.

Günther (1861) recorded *O. maculatus* and described *O. hodgsoni* in the collections of B. H. Hodgson from Nepal. He characterised *hodgsoni* as follows : "The height of the body is one-fifth of the total length (the caudal fin not included), the length of the head one-fourth. Scales very small. The dorsal fin is short and elevated, rather higher than the body below ; the second spine is very short, serrated posteriorly. The origin of the dorsal fin is exactly on the middle between the extremity of the snout and the base of the caudal fin".

In Günther's (1868) catalogue, all his Nepalese specimens (one stuffed 18" long, one adult female 9" long and a young specimen, all presented by B. H. Hodgson) and one specimen from Kumaon presented by Capt. Strackey were referred to *O. richardsonii*. *O. plagiostomus* was characterised by Günther on Afghanistan specimens (one stuffed adult from Jallalabad and skins of one adult and one half-grown from Helmand River) while *O. sinuatus* was characterised on Punjab and Kashmir specimens. McClelland's young specimen of *O. maculatus* from Gandamuck (Afghanistan) was referred to *O. sinuatus*. *O. griffithii* and *O. guttatus* were not described at all in the catalogue but were referred to in a footnote as doubtful species. From Günther's description of *O. plagiostomus*, *O. sinuatus* and *O. richardsonii* the three species appear to have been separated by means of the following characters :—

<i>O. plagiostomus</i>	<i>O. sinuatus</i>	<i>O. richardsonii</i>
Head-length 1/5 of total length.	Head-length 1/5 of total length.	Head-length 1/6 of total length.
Dorsal fin originates mid-way between tip of snout and caudal-root, advance of root of ventral.	Dorsal fin originates nearer root of caudal, opposite to root of ventral.	Dorsal fin originates mid-way or slightly nearer snout than caudal-root, advance of the root of ventral.
Dorsal osseous ray strong, serrature feeble.	Dorsal osseous ray moderately strong, serrature well developed.	Dorsal osseous ray strong, serrature developed.
Anal fin narrow and deep	Anal fin narrow and deep.	Anal fin very narrow and deep.
Anal scales well developed, large as broad as orbit.	Anal scales moderately developed, large, half as broad as orbit.	Anal scales well developed, as large as orbit.

Day (1878) in the Fishes of India described *O. plagiostomus*, *O. sinuatus* and *O. richardsonii*. Referring to *O. griffithii* under the description of *O. plagiostomus* he remarked that *O. griffithii* "is said to differ but little from the above". From a comparison of his descriptions in

the *Fauna of British India* (1889) it will be seen that Day distinguished the three species by the following characters :

<i>O. plagiostomus</i>	<i>O. sinuatus</i>	<i>O. richardsonii</i>
D. 10,11 $\frac{2-3}{8}$, P. 17	D. 3-4/8, P. 17, V. 10.	D. 11 (3/8), P. 17, V. 10.
V. 11, A. 7.(2)/5, C.19. L. 1.	A. 2-3/5, C. 19, L. 1.	A. 7. (2/5), C. 19. 1.1.
110. L. tr. 170.	105 Ver. 24/23.	98-100. L. tr. 140.
Head-length $5\frac{1}{2}$ -6 in total length	Head-length $5\frac{1}{2}$ -6 in total length.	Head-length 4-6 in total length.
Dorsal commences in advance of ventrals and mid-way between snout and root of caudal.	Dorsal commences a little before ventrals and slightly nearer snout than root of caudal.	Dorsal commences slightly before ventral and mid-way between snout and root of caudal.
Anal scales about as large as orbit	Anal scales $\frac{1}{2}$ as large as orbit.	Anal scale $\frac{2}{3}$ as large as orbit.
Colour uniform	Black spots on body	Colour uniform.

Regan (1907) reported on a collection of fish from Nepal and described a new species under the genus *Diptychus*, *D. annandalei*, basing his description on three young (70 mm. total length) specimens. He also reported *O. richardsonii* from the same collection.

Chaudhuri (1913) described a new species, *O. molesworthii* basing his meagre description on a single specimen from Yombung at an altitude of 1,100 feet in the Abor Hills.

Hora (1921) referred to a single specimen from eastern Himalayas below Darjeeling to *O. molesworthii*.

Mukherji (1936) referred Regan's new species of the genus *Diptychus*, *D. annandalei* to *Schizothorax*.

In his ichthyology of Afghanistan Hora (1933) recorded *Oreinus sinuatus* var. *griffithii* McClelland from the Paghman river and considered it in all respects similar to *griffithii* collected by Dr. B. N. Chopra from the Chitral River.

Hora (1934) in his account of "Fishes of Chitral" referred specimens obtained from the Kunar River (or Chitral River), the type locality of *O. griffithii* to *O. sinuatus* var. *griffithii* McClelland, and remarked *O. griffithii* very closely resembles *O. sinuatus* in its general facies, but differs in having somewhat finer serrations in the dorsal spine, in the shorter length of the spine and in the fact that all the fins, especially the anal are shorter. The vertical anal scales are obsolete in *O. griffithii*, with the exception of the two specimens mentioned above, whereas in *O. sinuatus* the scales, though small, are fairly well-marked and distinct. In view of these differences it seems desirable to treat *O. griffithii* as a distinct form, for the time being at least, and at the same time to express its close affinity to *O. sinuatus*. For these reasons, I have regarded *griffithii* as a variety of *sinuatus*"

Hora & Mukherjee (1935) extended the range of *O. molesworthii* to the Chindwin drainage system in the Naga Hills. In the same year Hora (1935) reported on a further collection of fish from Afghanistan made by Sir Richard. Maconachie, Major A. E. Farwell and Capt. E. W. Fletcher

from all the major river systems of Afghanistan namely, the Kabul, the Helmand and the Oxus. From the Kabul system Hora reported a single specimen of *O. sinuatus griffithii*.

Hora (1937) reported *O. richardsonii* from Soondrijal Hills above Kathmandu and *Diptychus anandalei* from Pharping in Katmandu Valley.

Shaw and Shebbeare (1938) in their account of fishes of northern Bengal described *Oreinus molesworthii* and characterised it as follows :

“Length of head 6, of caudal 6.3/4, height of body 5 in total length. Scales very small and not very evident, those immediately behind the gill opening and below the lateral line rudimentary. Vent and base of anal in a sheath formed of enlarged, imbricate scales”

Nichols (1943) in his account of “The freshwater fishes of China” considered four species, *S. molesworthii* (Chaudhuri) *S. prenenti* (Tchang), *S. sinensis* Herzenstein and *S. grahmi* (Regan) under the subgenus *Schizophyge* characterised by a horny lower jaw.

Misra (1949) showed that Heckel's species *Schizothorax plagios tomus* and *S. sinuatus* were based on male and female specimens respectively of the same species and relegated *O. sinuatus* to the synonymy of *O. plagiostomus*.

De Witt (1956) in his contribution to the ichthyology of Nepal referred a single specimen of 87.9 mm. to *Schizothorax* sp. and remarked that “it is close to, if not the same as the fish described as *Diptychus annandalei* by Regan” He identified thirteen other specimens ranging from 48.4 to 157.5 mm. in total length as *O. richardsonii* reproducing Gray's original illustration of the species.

From a close scrutiny of the descriptions and notes relating to the various species given above it would become abundantly clear that the characters used by the various workers in segregating the species were highly variable and not dependable for their identification. In order, therefore, to ascertain whether there is any significant difference in the various closely related populations of *Schizothorax* the morphometric characters of the samples of *Schizothorax* from the different drainages in the collections of Zoological Survey of India were studied and their range of variations biometrically analysed.

III—MORPHOMETRIC CHARACTERS STUDIED

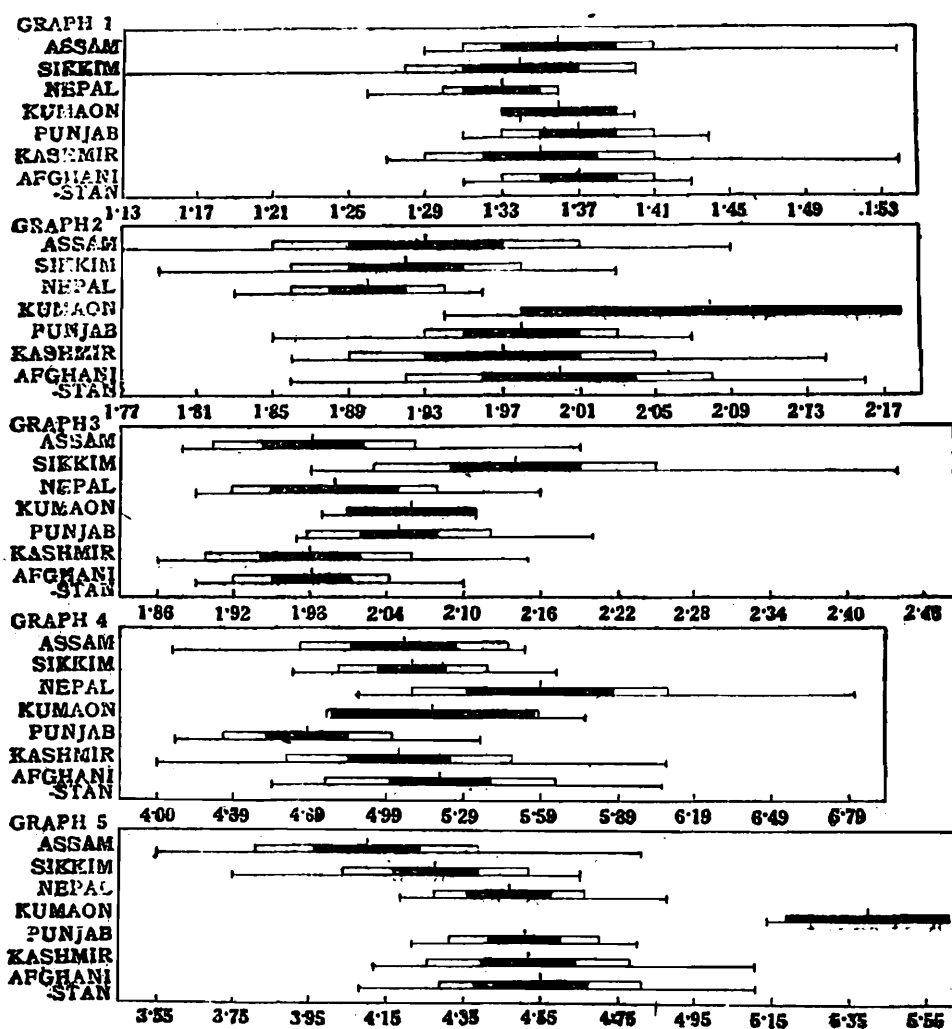
The following morphometric characters of the samples of the different populations occurring in the various drainages of the Himalayas including Afghanistan were studied :

1. Length of head	in standard length.
2. Depth of body	in standard length.
3. Distance between snout and origin of dorsal fin	in standard length.
4. Distance between snout and origin of pelvic fin	in standard length.
5. Distance between snout and origin of anal fin	in standard length.
6. Length of snout	in length of head.
7. Width of head	in length of head.
8. Height of head	in length of head.
9. Diameter of eye	in length of head.
10. Inter-orbital width	in length of head.
11. Length of pectoral fin	in length of head.
12. Length of caudal peduncle	in length of head.
13. Length of pelvic fin	in length of head.
14. Length of anal fin	in length of head.

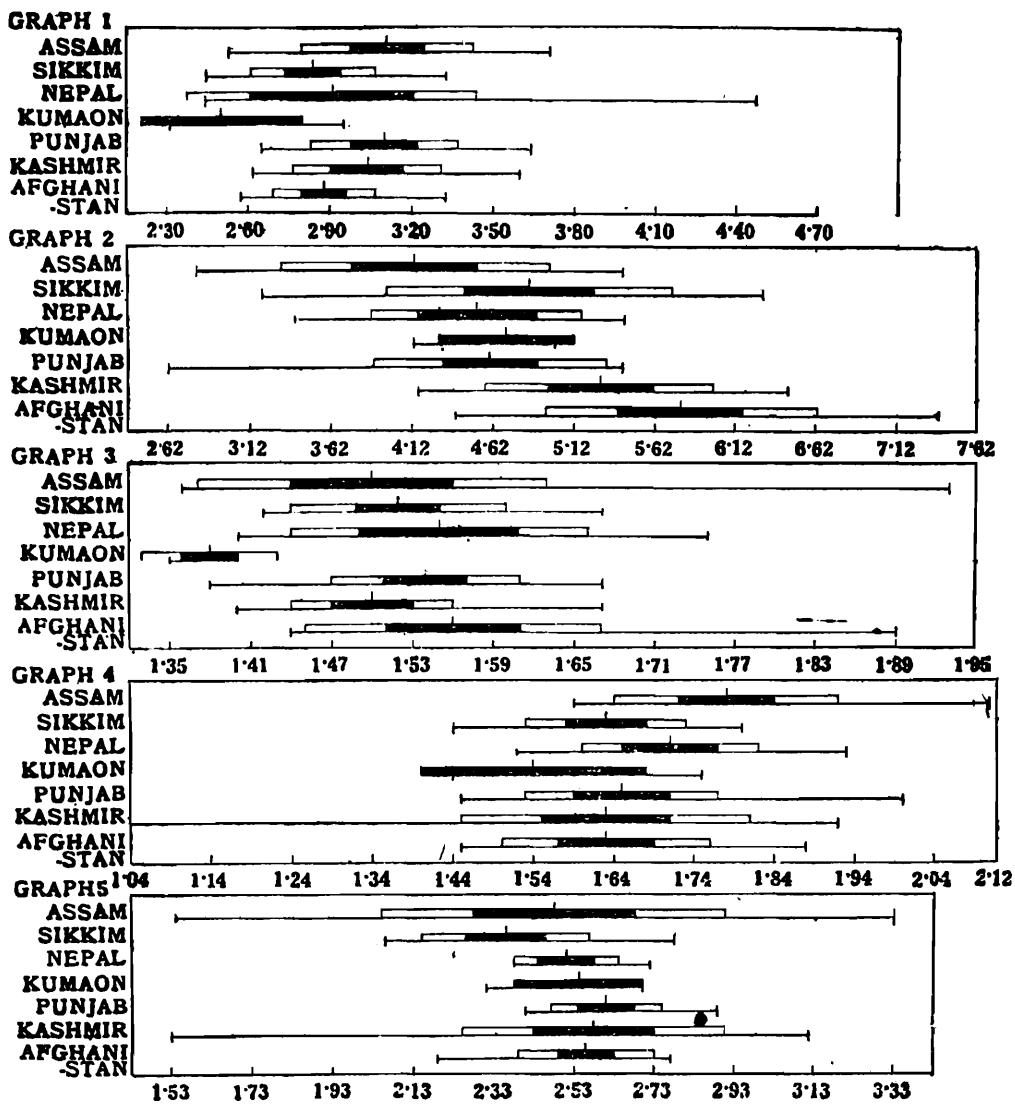
15. Height of dorsal fin .. in length of head.
 16. Breadth of mouth . in width of head.
 17. Distance between pelvic and anal fin .. in distance between pelvic and base of caudal.
 18. Length of pelvic fin in distance between pelvic origin and anal fin.
 19. Height of caudal peduncle .. in length of caudal peduncle.
 20. Scales along lateral line.

IV—BIOMETRIC COMPARISON OF POPULATIONS

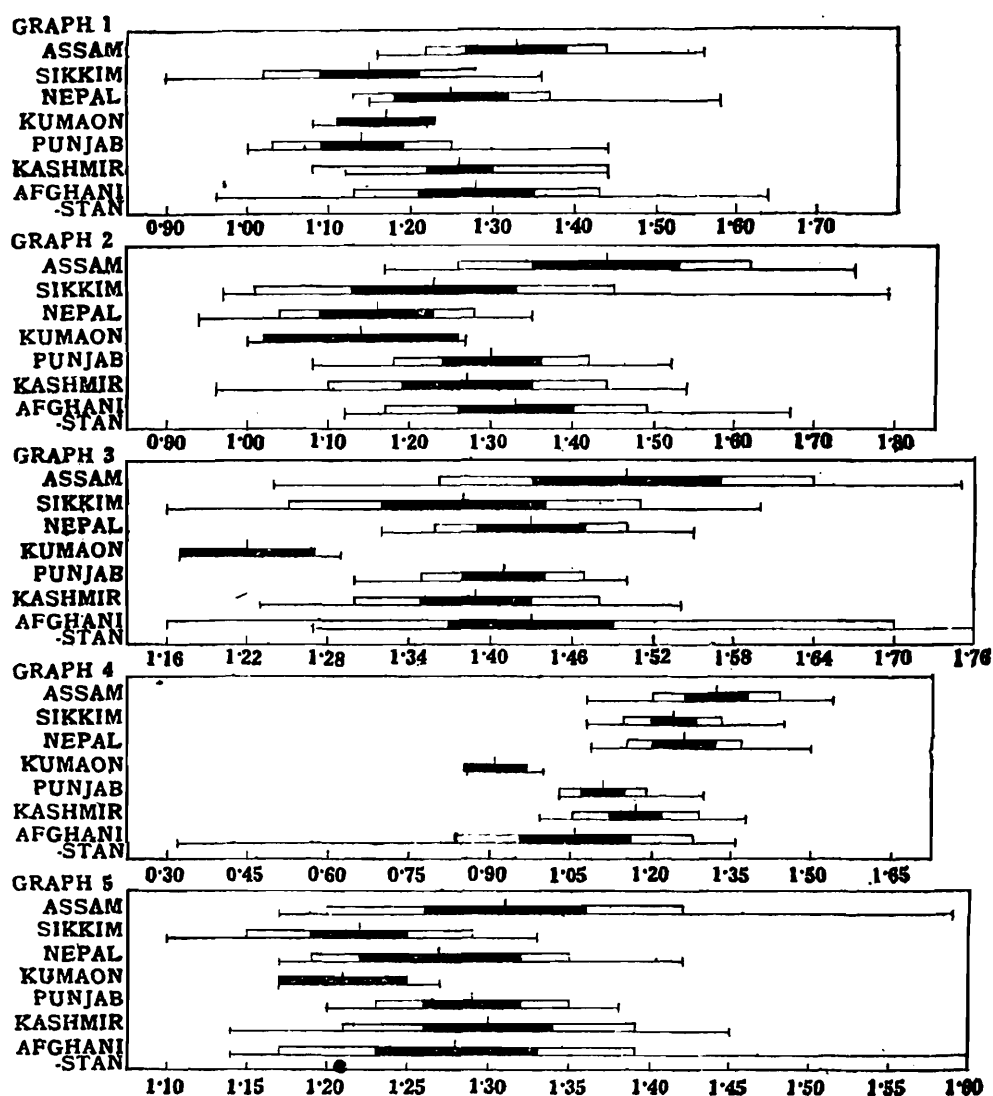
For a correct taxonomic assessment of the samples the range, mean, standard deviation and standard error, were calculated for all the twenty characters enumerated and this data are presented below in graph form (*vide*, Text-figs. 1-4). For each sample diagram shows (1) the total range of variation of the particular character by the horizontal line, (2) the mean, by the simple streak projecting upwards in the middle of it, (3) two standard errors of the mean on either side of the mean by the blackened area of each bar and (4) one standard deviation on either side of the mean by one half of each black bar plus the white bar at either end. The overlap or divergence of the standard deviations of the characters studied has been taken to determine the status of the populations (*vide*, Hubbs and Perlmutter, 1942; Hubbs and Hubbs, 1953; Menon, 1964).



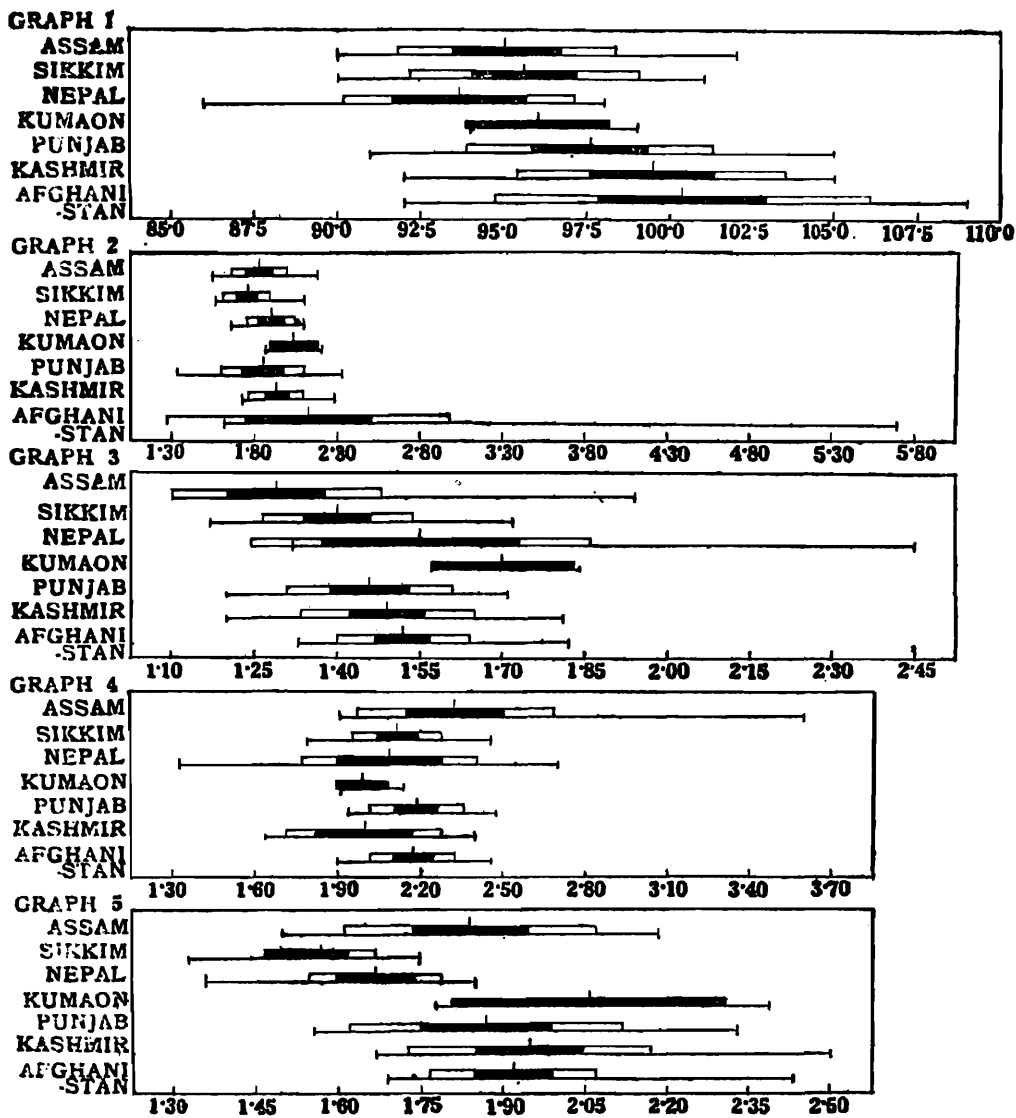
TEXT-FIG. 1. Variations in the different populations of *Schizothroax*. Graph 1. Distance between snout and origin of anal fin in standard length. Graph 2. Distance between snout and origin of pelvic fin in standard length. Graph 3. Distance between snout and origin of dorsal fin in standard length. Graph 4. Depth of body in standard length. Graph 5. Length of head in standard length.



TEXT-FIG. 2. Variations in the different populations of *Schizothorax*. Graph 1. Inter-orbital width in length of head. Graph 2. Diameter of eye in length of head. Graph 3. Height of head in length of head. Graph 4. Width of head in length of head. Graph 5. Length of snout in length of head.



TEXT-FIG. 3. Variations in the different populations of *Schizothorax*. Graph 1. Height of dorsal fin in length of head. Graph 2. Length of anal fin in length of head. Graph 3. Length of pelvic fin in length of head. Graph 4. Length of caudal peduncle in length of head. Graph 5. Length of pectoral fin in length of head.



TEXT-FIG. 4. Variations in the different populations of *Schizothorax*. Graph 1. Scales along lateral line. Graph 2. Height of caudal peduncle in length of caudal peduncle. Graph 3. Length of pelvic fin in distance between origin of pelvic and anal fins. Graph 4. Distance between pelvic and anal fin in distance between pelvic and base of caudal. Graph 5. Breadth of mouth in width of mouth.

From the inter-gradation of characters as shown in the graphs (Text figs. 1-4) it is evident that the various populations studied except that of the Kumaon population are identical. The Kumaon population differs from the rest in the character of its head length. This character is considered of great taxonomic significance and the divergence shown in the character (*vide*, Text-fig. 1, Graph 5) by the Kumaon population necessitates its being segregated as a distinct species, the rest of the populations being treated as belonging to the same species.

V—SYSTEMATIC ACCOUNT*

Schizothorax richardsonii (Gray)

Cyprinus richardsonii Gray, *Ill. Indian Zool.*, pt. 10, pl. 14, fig. 2. 1832.—*Schizothorax plagiostomus* Heckel *Fisch. Caschmir*, p. 16, pl. 1838.—Heckel, *Fische Kaschmir* in Hugel's *Reich*, p. 357; 1844, text-fig.

*I have not examined any material from China and hence the systematic position of *S. molesworthi* (Chaudhuri), *S. prenanti* (Tchang), *S. sinensis* Herzenstein and *S. arakani* (Regan), all characterised by horny lower jaw and known from China, has not been ascertained.

- Oreinus richardsonii* McClelland, *Asiatic Res.*, pp. 273, 335. 1839.—Valenciennes (in : Cuvier and Valenciennes), *Hist. Nat. Poiss.*, 16, p. 227, 1842. Günther, (in part).—*Cat. Fish. Brit. Mus.*, 7, p. 161, 1868. Day, *Fish. India*, p. 530, pl. 125, fig. 4, 1878. Day, *Faun. Brit. India Fish.*, 1, p. 250. 1889.—Regan, *Rec. Indian Mus* 1, p. 157, 1907.—Chaudhuri, *Rec. Indian Mus.*, 8, 247, 1913—Hora, *Rec. Indian Mus.*, 39, pl. 44, 1937. de Witt., *Stanford ichthyol. Bull.*, 7, (4), p. 67, fig. 3, 1960.
- Schizothorax sinuatus* Heckel, *Fische Caschmir*, p. 21, pl. 2, 1838.—Heckel, *Fische Kaschmir* in Hugel's *Reich*, p. 359, text-fig. 2, 1844.—*Oreinus guttatus* McClelland, *Asiatic Res.*, pp. 283, 344, pl. 39, fig. 1, 1839.
- Oreinus plagiostomus*. McClelland, *Calcutta J. Nat. Hist.*, 2, p. 580, 1842.—Günther, *Cat. Fish. Brit. Mus.*, 7, p. 160. 1868.—Day, *Fish. India*, p. 530. 1878.—Day, *Faun. Brit. India. Fish.*, 1, p. 250, 1889.—Mukherjee, *Mem. Conn. Acad.*, 10, Art. 18, p. 348, 1936—Misra, *J. zool. Soc. India*, 1 (1), p. 39-40, 1949.
- Oreinus sinuatus* Günther, *Cat. Fish. Brit. Mus.*, 7, p. 161, 1868.—Day, *Fish. India*, 7, 529, pl. 124, fig. 4, 1878.—Day, *Faun. Brit. India. Fish.*, 1, p. 248, fig. 88, 1889.—Mukherjee, *Mem. Conn. Acad.* 10, Art. 18, p. 348, 1936.
- Oreinus maculatus* McClelland, *Asiatic Res.*, 19, pp. 274, pl. 57, fig. 6, 1839.—McClelland *Calcutta J. nat. Hist.*, 2, p. 580, 1842.—Günther, *Proc. zool. Soc. Lond.*, p. 224, 1861.
- Diptychus annandalei* Regan, *Rec. Indian Mus.*, 1, p. 157. 1907.
- Oreinus molesworthii* Chaudhuri.—*Rec. Indian Mus.*, 8, pp. 247, 248, pl. 7, fig. 2, 2a, 2b, 1913.—Hora, *Rec. Indian Mus.*, 22, p. 734, 1921.—Hora, *Rec. Indian Mus.*, 37, p. 391, 1935.—Shaw and Shebbeare, *J. Asiat. Soc. Beng.*, 3, p. 17, fig. 9, 1937.
- Specimens examined*.—INDIA : 18, 65.0 to 170.0 mm., from Dupla Ko, N.E.F.A., K. C. Jayaram, 6.v. 1961 ; 1, 100.0 mm., N.E.F.A., S. Biswas, 25.vii. 1961, 4, 55.0 to 60.0 mm., Norgam River below Birtrelling Village, N.E.F.A., K.C. Jayaram, 16.v. 1961 ; 1, 210.0 mm. Yembung, Abor Country, Assam. S. W. Kemp, 1912 ; 2, 96.0 to 147.0 mm., Assam, purchased from F. Day ; 6, 50.0 to 234.0 mm., Palampur Kangra Dist., Punjab. S.L. Hora, 8.vi. 1926 ; 13, 70.0 to 234.0 mm. Chamba, Punjab (3000 ft.), D. Bagchi, v. 1927 ; 1, 250.0 mm., Dal Lake between Nasim Bagh Ghat and Sonalanka, Coll. *Kashmir Valley Survey* 1954 ; 4, 96.0 to 280.0 mm., Coll. *Kashmir ; Valle. Survey* 2 215.0 to 250.0 mm., Junction of Yelbal stream with Dal Lake, Coll. *Kashmir Valley Survey* 1954 ; 5, 117.0 to 193.0 mm., Rishikhola, Rishi W. Sikkim, A.G.K. Menon, 15. iv. 1959 ; 21, 175.0 to 240.0 Denton, 5000 ft. W. Sikkim, A.G.K. Menon, 4. iv. 1959 ; 1, 236.0 mm., Rorathong, Sikkim ; 9, 165.0 to 245.0 mm., Rorathong Sikkim, S. L. Hora, 17 xii. 1938 ; 8, 163.0 to 218.0 mm., Rhanikkhola, Gangtok, Sikkim. 15.viii. 1955 ; 4, 185.0 to 270.0 mm., Rhanikhola, Ranipool, near Gangtok, A. G. K. Menon, 15. viii. 1959 ; 6, 76.0 to 190.0 mm., Samdong, 3 miles down Chakung, W. Sikkim, A.G.K. Menon, 30. iii. 1957 ; 7, 135.0 to 205.0 mm., Dikchukhola, at the confluence of Dikchukhola with Tista, W. Sikkim, A.G.K. Menon, 14.viii. 1959 ; 9, 8.0 to 165.0 mm., Mangon, N. Sikkim, A.G.K. Menon, viii. 1959 ; 24, 13.0 to 156.0 mm., 1½ miles. W. of

Pechrek, W. Sikkim, *A.G.K. Menon*, 3. iv. 1959. NEPAL : 5, 135.0 to 195.0 mm. Kulikhani River, Kulikhani, Purchased from *Dr. Day*, 1. iv, 1947 : 6, 90.0 to 201.0 mm., Fanamati River at Marku, 24. v. 1947
 AFGHANISTAN : 44, 130.0 to 220.0 mm., Farakhellum, *S. Akhter Ali*, 14. xii. 1937 ; 27, 127.0 to 237.0 mm., Helmound River, *S. Akhter Ali*, 14. xii. 1937 ; 8, 21.5 to 40.0 mm., Mastuj River between Koghāzi and Mastuj, *B.N. Chopra*, 1, 190.0 mm., Khinam, Andrat River near village Doshi, *S. Akhter Ali* 28, vi, 1940 ; 1, 238.0 mm., near Gulbagh bridge Kabul River, *S. Akhter Ali*, 28. vi. 1940 ; 210.0 mm., Upper Kagan Range, 1, 280.0 mm., pallarga, Chitral, *B. N. Chopra* ; 1, 172.0 mm. Chitral, *B. N. Chopra* ; 13, 120.0 to 225.0 mm., Chitral, Afghanistan, *B.N. Chopra*.

Diagnosis.—A *Schizothoracine* with suctorial mouth and attaining a length of about 2ft. (600.0 mm.) in length. There are about 97 scales in lateral line. The length of head 4.4 in standard length.

Description.—Depth of body 4.76 (4.12 to 6.18) in standard length, length of head 4.46 (4.05—5.05). Width of head 1.61 (1.41—1.85) in length of head, height of head 1.47 (1.03—1.71). Pupil of eye little in front of middle of length of head, 2.47 (1.86—3.69) in length of snout and 2.20 (1.45—2.81) in inter-orbital width. The inter-orbital space is broad and flat. Snout tuberculated in adult males, smooth in females and young. Mouth inferior, transverse and slightly arched, the width is somewhat greater than half width of head. Two pairs of small barbels. 97 (86—110) scales in lateral line. Dorsal $3/8$; the dorsal spine long and serrated ; its height 1.07 in body depth. Origin of dorsal over 30th to 32nd scale of lateral line, distance between its anterior origin and tip of snout 1.95 (1.62—2.34) in standard length. Pectorals shorter than head, its length 1.21 (1.10—1.33) in length of head. Length of pelvics 1.31 (1.21—1.44) in head, its origin directly below dorsal origin or slightly behind. Pre-pelvic distance 1.93 (1.79—2.22) in standard length. Anal $3/5$; origin of anal at 65th to 68th scale of lateral line. Pre-anal distance 1.35 (1.24—1.90) in standard length. Length of caudal peduncle 1.05 (0.88—1.32) in length of head, width 1.86 (1.54—2.15) in its own length.

Colouration.—In alcohol, uniform silvery or with black spots.

Distribution.—Assam and Eastern Himalayas through Bhutan, Sikkim and Nepal to Punjab, Kashmir and Afghanistan.

Schizothorax kumaonensis sp. nov.

Specimens examined.—3, 172.0 to 189.0 mm. in total length, Naini Tal, Uttar Pradesh, Coll. *Capt. R. E. Lloyd* ; 1, 185.0 mm., Himalayas, purchased from F. Day.

Diagnosis.—A *Schizothoracine* with suctorial mouth and attaining a length of 185.0 mm. in length. There are 97 to 98 scales in lateral line. The length of head 5.4 in standard length.

Description.—Depth of body 5.17 (4.85—5.76) in standard length, length of head 5.40 (5.14—5.57). Width of head 1.54 (1.44—1.75) in length of head, height of head 1.38 (1.35—1.40). Pupil of eye little in front of middle of length of head, 1.82 (1.60—2.17) in length of snout and 1.85 (1.58—2.17) in inter-orbital width. The inter-orbital space broad and flat. Snout smooth. Mouth inferior, transverse and

slightly arched, the width is greater than half width of head. Two pairs of small barbels. 96 (94-99) scales in lateral line. Dorsal $3/8$; the dorsal spine long and serrated, its height 1.22 (1.09—1.32) in body depth. Origin of dorsal over 36—37 scale of lateral line, distance between its anterior origin and tip of snout 2.06 (1.99—2.11) in standard length. Pectorals shorter than head; its length 1.21 (1.17—1.27) in length of head. Length of pelvics 1.22 (1.17—1.29) in head, its origin directly below dorsal origin. Pre-pelvic distance 2.08 (1.94—2.15) in standard length. Anal $3/5$. Origin of anal at 66—70 scale of lateral line. Pre-anal distance 1.36 (1.34—1.40) in standard length. Length of caudal peduncle 0.91 (0.86—1.0) in length of head, width 2.04 (1.87—2.21) in its own length.

Colouration.—In alcohol, uniform silvery.

Type specimens.—Deposited in the National Collections, Zoological Survey of India, Calcutta.

Holotype.—Reg. No. F. $\frac{2712}{1}$, 187.0 mm. in total length, Coll. Capt. R. E. Lloyd.

Type Locality.—Naini Tal, Uttar Pradesh, India,

Paratypes.—Reg. Nos. F. $\frac{2714}{1}$ & F. $\frac{2715}{1}$, 2 specimens, 172.0 & 173.0 mm. in total length, taken along with the holotype and bearing the same data as the holotype. Reg. No. 2755, 1 specimen, 185.0 mm., Himalayas, purchased from F. Day.

Relationship.—*Schizothorax kumaonensis* is quite close to *S. richardsonii*: it can be easily distinguished by its shorter head, the length of head being more than five times in standard length, whereas in *richardsonii* it is lower than five times (*vide*, Text-fig. 1, graph 5).

VI—SUMMARY

The literature relating to the systematics of the various species of *Schizothorax* is reviewed. The morphometric data of the various samples of *Schizothorax* from the Himalayas, Kashmir and Afghanistan present in the collections of the Zoological Survey of India is biometrically analysed and the results show that there are only two distinct species, *S. richardsonii* (Gray) and *S. kumaonensis* sp. n., full descriptions of which are given.

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