

XVI. — SOME NOTES ON THE GENUS *HEMIPHYLLODACTYLUS* BLEEKER.

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A look at the key to the species of the genus *Lepidodactylus* in Boulenger's Catalogue of Lizards (I, 1885, p. 162) shows at once that the species are placed in two groups differing in the development of the inner digit. This was first noticed by STEJNEGER (1899, p. 800) who transferred *L. crepuscularis* (Bav.), *L. ceylonensis* Blgr. and *L. aurantiacus* (Bedd.) to the genus *Hemiphyllodactylus* Blkr. At the same time he described a new species, *H. leucostictus*, from the Hawaii Islands. The different authors on Asiatic herpetology did not notice this publication as it chiefly dealt with the land-reptiles of the Sandwich-Islands. The attention was again attracted to it by TAYLOR (1922, p. 65) who (1918, p. 237) described a new species, *H. insularis*, from the Philippine Islands. While working on a revision of the Indo-Australian *Gekkonidae*, I arrived at the same conclusion as STEJNEGER and TAYLOR. Moreover I (1931, p. 11) am of the opinion that the following species must be united: *H. typus* Blkr., *H. crepuscularis* (Bav.), *H. ceylonensis* (Blgr.), *H. leucostictus* Stejn., *H. insularis* Tayl. and *H. margarethae* Brongersma. Perkins (1903, p. 367) already placed *H. leucostictus* in the synonymy of *Lepidodactylus crepuscularis*. He did not state any reasons and I think he was wrong to return the species to the genus *Lepidodactylus*. The resemblance between *H. typus* (*Spathoscalabotes*) and *L. crepuscularis* was noticed by WERNER (1899, p. 374) but he did not unite them. *Hemiphyllodactylus aurantiacus* (Bedd.) is considered by me to be a distinct species.

Dr. M. A. SMITH (London), working independently, reached the same conclusion (in litt.). Dr. SMITH is of the opinion, that some other species from the asiatic mainland must be referred to this genus. These species did not fall within the scope of my revision and I had no specimens for examination. I may refer to Dr. SMITH's paper that is to be published elsewhere.

All the species mentioned above were examined by me and my heartiest thanks are due to the following persons who have sent me specimens from their collections for examination:

1) Formerly of the Zoological Museum Amsterdam, where the greater part of this study was accomplished.

Dr. J. ROUX, Musée d'Histoire Naturelle, Bâle; Dr. E. AHL, Zoologisches Museum, Berlin; Prof. Dr. V. VAN STRAELEN and Dr. L. GILTAY, Koninklijk Natuurhistorisch Museum, Brussel; Dr. R. MERTENS, Senckenberg Museum, Frankfurt a. M.; Dr. D. VINCIGUERRA, Museo Civico di Storia Naturale, Genova; Prof. Dr. G. DUNCKER, Zoologisches Museum, Hamburg; Prof. Dr. E. D. VAN OORT, 's Rijks Museum van Natuurlijke Historie, Leiden; Dr. H. W. PARKER and Dr. M. A. SMITH, British Museum of Natural History, London; Dr. L. STEJNEGER and Miss D. M. COCHRAN, United States National Museum, Washington.

Mrs. BREIJER (Dr. N. DE ROOIJ) was so kind as to give me some information on the specimens she mentioned in her book.

Especially I want to thank Prof. Dr. L. F. DE BEAUFORT, Zoologisch Museum Amsterdam, for the material he placed at my disposal, for the free hand he gave me in making exchanges and loans and last not least for the kind interest he took in my work.

The following list shows the specimens I examined. They are placed according to the localities and under the names with which I received them:

Ceylon <sup>1)</sup>.

1. *L. ceylonensis*, 1 ex., Hambantota, Brit. Mus. N. H. Reg. n<sup>o</sup>. 1910.  
3. 16. 4.
2. id. 1 ex., Gampola, 2000 ft., Zool. Mus. Amst. (exch. w. Brit. Mus.).

Tenasserim.

3. *L. ceylonensis*, 1 ex., Malewoon, 8—IX—1887, Museo Civico, Genova.

Sumatra.

4. *H. typus*, 1 ex., East Indian Archipelago, Mus. Leiden, n<sup>o</sup> 3991 <sup>2)</sup>.
- 5—9. id. 5 ex., Moeara Laboe, Mus. Leiden, n<sup>o</sup> 4172 <sup>3)</sup>.
10. id. 1 ex., Fort de Kock, leg. JACOBSON X—1913, Zool. Mus. Amsterdam.
11. id. 1 ex., Deli, leg. DE BUSSY, Zool. Mus. Amsterdam.

1) The specimen mentioned by WERNER (Mitt. Naturh. Mus. Hamburg XXX, 1913, p. 7) was examined by me, it belongs to *Lepidodactylus lugubris* (Dum. et Bibr.).

2) This specimen from BLEEKER's collection was at first supposed to be the type. BOULENGER (1887b, p. 152) and GÜNTHER (in: BOULENGER, Cat. Percif. Fishes Brit. Mus. 2nd Ed. 1, 1895, p. VII, note) state that BLEEKER's types were sold to the British Museum in 1863 (or at least years before 1879, while our specimen was acquired in 1880). The type of *H. typus* is the same as that of *Spathodactylus mutilatus* Gthr. (BOULENGER l. c.). The specimen is listed here from Sumatra as BLEEKER (1860a, 1860b) mentions only that island in his descriptions.

3) HUBBRECHT (1886, p. 3) mentions only three specimens of *Spathodactylus mutilatus* from this locality. The bottle however contains five so that the origin of these specimens seems to be a little doubtful.

- 12-13. *H. margarethae* 2 ex., Fort de Kock, leg. JACOBSON, Zool. Mus. Amsterdam <sup>1)</sup>. Type and paratype.  
14-15. id., 2 ex., Takengon, Atjeh, 1200 M., ROOKMAAKER leg., Mus. Brussel. Paratypes.

Simaloer (West off Sumatra).

The specimen mentioned by DE ROOIJ (1915B, p. 47, 340 and Zoolog. Meded. Leiden VI, 1922, p. 23) as *H. typus* proved to be a young *Gehyra mutilata* (Wieg.) (= *Peropus m.*).

Nias (West off Sumatra).

16. *H. typus*, 1 ex., Lelewoea, leg. KLEIWEG DE ZWAAN, Zool. Mus. Amsterdam.

Engano (West off Sumatra).

- 17-19. *L. ceylonensis*, 3 ex., leg. Modigliani, Museo Civico Stor. Nat. Genova.  
20. id. 1 ex., leg. Modigliani, Brit. Mus. Nat. Hist. Reg. n<sup>o</sup> 91. 10. 27. 2.

Java.

21. *H. typus*, 1 ex., Nongkadjadar, Tengger Mts. 1300 m. leg. JACOBSON, Zool. Mus. Amst.  
22. *L. ceylonensis*, 1 ex., Willis Mts., Kediri, 5000 ft., Brit. Mus. Nat. Hist., Reg. n<sup>o</sup> 85. 12. 31. 7.

Bali.

23. *H. typus*, 1 ex., Gitgit, leg. MERTENS, 16—V—1927, Senckenberg Mus.

Soembawa.

24. *H. typus*, 1 ex., Batoe Doelang, leg. MERTENS, 16—V—1927, Senckenberg Mus.

Borneo.

25. *L. ceylonensis*, 1 ex., Sandakan, N. Borneo, Brit. Mus. Nat. Hist. Reg. n<sup>o</sup> 95. 9. 11. 5.  
25a. *H. typus*, 1 ex., Borneo, leg. Pagel, Zool. Mus. Berlin n<sup>o</sup> 11355.

Philippine Islands.

26. *H. insularis*, 1 Cotobato Coast, Mindanao, Zool. Mus. Amst. (exch. with E. H. TAYLOR 1923).

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<sup>1)</sup> These two specimens were identified by DE ROOIJ (1915, p. 48) as *L. ceylonensis*. With the following two they were already referred by me (1931, p. 11) to *H. typus*.

## New Caledonia.

27. *L. crepuscularis*, 1 ex., Koué, 9—VIII—1911, Mus. Hist. Nat. Bâle, n° 6978.  
 28. id. 1 ex., Oubatche, mai 1911, Mus. Hist. Nat. Bâle, n° 6979.  
 29. *H. crepuscularis*, 1 ex., Zool. Mus. Hamburg, n° 4025.

## Loyalty Islands.

30. *L. crepuscularis*, 1 ex. Ouvéa, Fayaoué, 15—V—1912, Mus. Hist. Nat. Bâle, n° 6980.

## Tonga Islands.

- 30a. *L. crepuscularis*, 1 ex., Tonga, leg. FRIEDLÄNDER, Zool. Mus. Berlin n° 15234.

## Sandwich Islands.

31. *H. leucostictus*, 1 ex. paratype, Hawaii, don. HENSHAW, U. S. Nat. Mus. n° 23460.  
 32. id. 1 ex. paratype, Kauai, Waiawa, V—1895, don V. KNUDSEN U. S. Nat. Mus. n° 23485.  
 33–34. id. 2 ex., Honolulu, leg. SNYDER, Zool. Mus. Amst. (exch. U. S. Nat. Mus. n°s 59724—5).  
 35–40. *L. crepuscularis*, 6 ex., Oahu, leg. PERKINS, Brit. Mus. Nat. Hist. Reg. n° 1903. 2. 21. 5—10 (2 specim. now: Zool. Mus. Amst.).

The characters that were chiefly used in separating the species are:

- 1° the denticulation of the digits.  
 2° the number of praeanal pores and  
 3° if present, the number of femoral pores.

BOULENGER (1885, p. 164) in describing *L. ceylonensis* states that it differs from *L. crepuscularis* by the lesser denticulation of the digits. The same difference was stated by STEJNEGER to exist between *H. leucostictus* and *H. crepuscularis*. The comparison of the specimens mentioned above showed that there may be a slight variation of this character, but it is purely individual. A specimen from Java has just as strongly denticulated digits as one from New Caledonia.

The specific value of differences in praeanal and femoral pores may be discussed together. It is sometimes very difficult to be sure whether pores are present or that the scales are only deeply pitted. The females often show pitted scales that may vary in number. Table I shows the number of pores as described by the different authors. Table II shows the variation in the male specimens examined.

## I

|                                           | Praeanal p. | Femoral p. |
|-------------------------------------------|-------------|------------|
| <i>H. typus</i> (De Rooij, 1915)          | 15          | —          |
| <i>L. ceylonensis</i> (Boulenger, 1912)   | 8           | 7—8        |
| id. (De Rooij, 1915)                      | 11          | —          |
| <i>H. insularis</i> (Taylor, 1922)        | 7—8         | 9—12       |
| <i>L. crepuscularis</i> (Boulenger, 1883) | 10          | —          |
| id. (Roux, 1913)                          | 13          | —          |
| <i>H. leucostictus</i> (Stejneger, 1899)  | 11          | 8          |

## II

| N <sup>o</sup> | Loc.          | Praeanal p. | Femoral p.      | Continuous |
|----------------|---------------|-------------|-----------------|------------|
| 1              | Ceylon        | 9           | 7—8             | —          |
| 4              | Sumatra       | 16          | 11              | nearly     |
| 12             | "             | 8           | 7—8             | —          |
| 17             | Engano        | +           | +               | 40         |
| 21             | Soembawa      | 11          | —               | —          |
| 27             | N. Caledonia  | 13          | 3—4             | —          |
| 33             | Sandwich Isl. | 12          | 6 <sup>1)</sup> | —          |
| 36             | "             | 11          | —               | —          |
| 39             | "             | 11          | —               | —          |
| 40             | "             | 11          | —               | —          |

A specimen from Engano (n<sup>o</sup> 17) has an uninterrupted series of praeanal- and femoral pores. Specimen n<sup>o</sup> 4 from Sumatra has a nearly continuous series of 38 pores, on the left side it is however interrupted by one scale, on the right side by about two irregular (probably regenerated) scales. An other Sumatran specimen has the series widely interrupted on each side. Such a widely interrupted series was described from *L. ceylonensis* by BOULENGER (1912, p. 49), while DE ROOIJ (1915, p. 48) mentions only praeanal pores in that species. One of the Hawaiian specimens (n<sup>o</sup> 33) possesses 12 praeanal pores and about 6 indistinct femoral pores on each side, while three others have only praeanal ones. The male from New Caledonia (n<sup>o</sup> 27) possesses praeanal pores and some femoral ones on each side, which were not mentioned by ROUX. Thus another difference stated to exist between *H. crepuscularis* and *H. leucostictus* proves to be of no value. The specimen from Soembawa (n<sup>o</sup> 21) has only praeanal pores. From the Philippine Islands I examined a female but Dr. SMITH (in litt.) states that a male in the British Museum has a nearly continuous series

1) Very small and rather indistinct.

of pores (interrupted by only one scale on each side). We see that the number of praeanal and femoral pores is subject to a rather wide variation. This character always taken as of high value for diagnosing species seems to be of no value in this genus.

It is not necessary to deal with all the characters separately. The variation is incorporated in the description of the species.

The description of the genus as given by DE ROOIJ (1915, p. 46) must be slightly changed: the inner toe has sometimes a very weak claw. Male with praeanal pores and often also with femoral pores.

Distribution: S. E. Asia, Western Part of Archipelago, Philippine Islands, New Caledonia and Loyalty Islands, Tonga Islands, Sandwich Islands.

Synonymy of the genus (only the more important references and those where only the genus is mentioned are given here, others may be found in the synonymy of the species).

#### **Hemiphyllodactylus Blkr.**

*Hemiphyllodactylus*, BLEEKER, Nat. Tijdschr. Ned. Ind. XX, 1860, p. 327; STEJNEGER, Proc. U. S. Nat. Mus. XXI, 1899, p. 799; DE ROOIJ, Rept. Indo-Austr. Arch. I, 1915, p. 46; TAYLOR, Liz. Philipp. Isl., 1922, p. 34, 37, 65; MERTENS, Abh. Senckenb. Natf. Ges. XLII, 1930, p. 156, 179.

*Spathodactylus*, GÜNTHER, Proc. Zool. Soc. Lond. 1872, p. 594; HOFFMANN, Bronn's Ordn. u. Klass. d. Thierr., VI, 3, Rept., 1883, p. 1186, 1204.

*Spathoscalabotes*, BOULENGER, Cat. Liz. Brit. Mus. I, 1885, p. 157; STRAUCH, Mém. Acad. Imp. St. Petersb. (7) XXXV, n° 2, 1887, p. 15; WERNER, Zool. Anz. XXII, 1899, p. 374; SCHAEFER, Arch. Natg. 68. Jahrg. Bd. I, 1902, p. 35; DITMARS, Reptiles of the World, 1922, p. 99.

*Lepidodactylus*, part., BOULENGER, Cat. Liz. Brit. Mus. I, 1885, p. 162; STRAUCH, Mém. Acad. Imp. St. Petersb. (7) XXXV, n° 2, 1887, p. 15; BOULENGER, Fauna Brit. Ind., Rept. 1890, p. 98; BOULENGER, Fauna Mal. Pen., Rept., 1912, p. 49; DE ROOIJ, Rept. Indo-Austr. Arch. I, 1915, p. 47.

#### **Hemiphyllodactylus typus Blkr.**

*Hemiphyllodactylus typus*, BLEEKER, Nat. Tijdschr. Ned. Ind. XX, 1860A, p. 326, 327; BLEEKER, l. c. XXI, 1860B, p. 285, 286, 327; BOULENGER, Ann. Mag. Nat. Hist. (5) XX, 1887B, p. 152; STEJNEGER, Proc. U. S. Nat. Mus. XXI, 1899, p. 802; DE ROOIJ in: Die Insel Nias, 1915A, p. 283, 284, 291; DE ROOIJ, Rept. Indo-Austr. Arch. I, 1915B, p. 46, 341, 342, 345, 346, figs. 29, 30, p. p.; TAYLOR, Liz. Philipp.

- Isl., 1922, p. 26, 66, 69, pl. 4, fig. 2; DE ROOIJ, Zoöl. Med. Leiden VI, 1922, p. 23, p.p.; MERTENS, Senckenbergiana IX, 1927, p. 242; BRONGERSMA in: DAMMERMAN, Zoogeogr. of Java, App. III, Treubia XI, 1929, p. 64; MERTENS, Abh. Senckenb. Natf. Ges. XLII, 1930, p. 134, 152, 153, 161, 171, 172, 178, 183, 186, 190, 194, 245; KOPSTEIN, Treubia XI, 1930A, p. 304; KOPSTEIN, id. XII, 1930B, p. 275; M. A. SMITH, Bull. Raffl. Mus. n<sup>o</sup> 5, 1931, p. 10, 20, 31; BRONGERSMA, Résult. scient. Voy. Ind. Or. Neerl., Verh. Kon. Nat. Hist. Mus. België, buiten reeks V, fasc. 2, 1931, p. 11, 12; Deraniyagala, Ceylon Journ. Sci. Sect. B (Spolia Zeylanica) XVI, 31, 1932, p. 308.
- Ptyodactylus gracilis*, BLEEKER, Nat. Tijdschr. Ned. Ind. XX, 1860A, p. 328 (mentioned in description of *H. typus*).
- Platydactylus crepuscularis*, BAVAY, Mem. Soc. Linn. Normandie XI, 1869, p. 8.
- Lepidodactylus crepuscularis*, BOULENGER, Proc. Zool. Soc. Lond. 1883, p. 122, pl. XXII, fig. 6; BOULENGER, Cat. Liz. Brit. Mus. I, 1885, p. 163; BOULENGER, id. III, 1887A, p. 486; WERNER, Zool. Anz. XXII, 1899, p. 374; SCHAEFER, Arch. Natg. 68. Jahrg., 1902, Bd. I, p. 35; PERKINS, Fauna Hawaiiensis I, Pt. 4, 1903, p. 366, 367; ROUX, Nova Caledonia, Zool. I, livr. 2, 1913, p. 94, 149, 150; GERMAIN, Proc. 3rd Pan Pacific Sc. Congr. Tokyo I, 1928, p. 1000.
- Hemiphyllodactylus crepuscularis*, STEJNEGER, Proc. U. S. Nat. Mus. XXI, 1899, p. 802; TAYLOR, Liz. Philipp. Isl., 1922, p. 66, 68.
- L. (Hemiphyllodactylus) crepuscularis*, WERNER, Zool. Jahrb. Syst. XIV, 1901, p. 383.
- Lepidodactylus* endemic spec. of New Caledonia, SARASIN, Nova Caledonia, Zool. IV, livr. 1, 1925, p. 64.
- Spathodactylus mutilatus*, GÜNTHER, Proc. Zool. Soc. Lond. 1872, p. 594, figs. 1, 2; HOFFMANN, Bronn's Ordn. u. Klassen d. Thierreichs VI, 3, Rept., 1883, p. 1204; HUBRECHT, Midden Sumatra IV, 1, 1886, p. 3, pl. I, figs. 2, 2a, 2b; SNELLEMAN, id., p. 16.
- Spathoscalabotes mutilatus*, BOULENGER, Cat. Liz. Brit. Mus. I, 1885, p. 157, pl. XIII, fig. 1; PARENTO et PICAGLIA, Atti Soc. Nat. Modena, Mem. Orig. III, 5, 1886, p. 14 (after TAYLOR, not seen by me); BOETTGER, Ber. Senckenb. natf. Ges. 1885—86, 1887, p. 96; BOULENGER, Cat. Liz. Brit. Mus. III, 1887A, p. 486; ELERA, Catal. sistem. Fauna Filipinas I, Vertebrados, 1895, p. 411; WERNER, Verh. Zool. Bot. Ges. Wien XLVI, 1896, p. 12; PALACKY, Zool. Jahrb. Syst. XII, 1899, p. 278; WERNER, Zool. Jahrb. Syst. XIII, 1900, p. 499; BARBOUR, Mem. Mus. Comp. Zool. XLIV, 1912, p. 179.
- Lepidodactylus ceylonensis*, BOULENGER, Cat. Liz. Brit. Mus. I, 1885, p. 164,

- pl. XIII, fig. 3; BOULENGER, id. III, 1887 A, p. 487; BOULENGER, Fauna Brit. Ind., Rept. Batr., 1890, p. 98; VINCIGUERRA, Ann. Mus. Civ. Genova (2) XII (XXXII), 1892, p. 521, 523; BOULENGER, Ann. Mus. Civ. Genova (2) XIII (XXXIII), 1893, p. 306, 316; FLOWER, Proc. Zool. Soc. Lond. 1896, p. 857, 867; FEA, Ann. Mus. Civ. Genova (2) XVII (XXXVII), 1896—97, p. 474; FLOWER, Proc. Zool. Soc. Lond. 1899, p. 602, 631; RIDLEY, Journ. Str. Br. Roy. Asiat. Soc. n° 35, 1901, p. 50; SCHAEFER, Arch. Natg. Jahrg. 68, Bd. I, 1902, p. 35; ANNANDALE, Journ. Proc. Asiat. Soc. Bengal I, 1905, p. 84, 91; P. SARASIN, Zool. Jahrb. Suppl. XII, 1910, p. 133; ANNANDALE, Spolia Zeylanica VIII, 1912, p. 134; BARBOUR, Mem. Mus. Comp. Zool. XLIV, 1912, p. 179; BOULENGER, Fauna Mal. Pen., Rept. Batr., 1912, p. 49; DE ROOIJ in: Die Insel Nias, 1915, p. 285; DE ROOIJ, Rept. Indo-Austr. Arch. I, 1915, p. 48; M. A. SMITH, Journ. Nat. Hist. Soc. Siam I, 1915, p. 239; ROBINSON et KLOSS, Journ. Fed. Mal. St. Mus. VIII, 1920, p. 299; DE ROOIJ, Zool. Med. Leiden VI, 1922, p. 234, 238; SWORDER, Singapore Naturalist, n° 5, 1925, p. 64; HARRISON, Report Australas. Ass. Adv. Sc. XVIII, 1928, p. 378; DE JONG, Misc. Zool. Sum. XXXII, 1928, p. 1, 2; MERTENS, Zool. Anz. LXXVIII, 1928, p. 79; BRONGERSMA in: DAMMERMAN, Zoogeogr. of Java, App. III, Treubia XI, 1929, p. 64 (erroneously from Celebes); MERTENS, Senckenbergiana XI, 1929, p. 27; MERTENS, Abh. Senckenb. natf. Ges. XLII, 1930, p. 170; M. A. SMITH, Bull. Raffl. Mus. n° 3, 1930, p. 49.
- Hemiphyllodactylus ceylonensis*, STEJNEGER, Proc. U. S. Nat. Mus. XXI, 1899, p. 802; TAYLOR, Liz. Philipp. Isl., 1922, p. 66, 68.
- Hemiphyllodactylus leucostictus*, STEJNEGER, Proc. U. S. Nat. Mus. XXI, 1899, p. 800, figs. 7, 8, 9; WERNER, Zool. Jahrb. Syst. XIV, 1901, p. 381, 386; TAYLOR, Philipp. Journ. Sci. XIII, 5, Sec. D., 1918, p. 239; SNYDER, Proc. U. S. Nat. Mus. LIV, 1919, p. 24; TAYLOR, Liz. Philipp. Isl., 1922, p. 66, 68.
- ? *Lepidodactylus aurantiacus*, SHELFORD, Journ. Str. Br. Roy. Asiat. Soc. n° 35, 1901, p. 50; BARBOUR, Mem. Mus. Comp. Zool. XLIV, 1912, p. 179.
- Hemiphyllodactylus insularis*, TAYLOR, Philipp. Journ. Sci., XIII, 5, Sec. D., 1918, p. 237, 240, 264, fig. 4, pl. I, figs. 6, 7; TAYLOR, Liz. Philipp. Isl., 1922, p. 18, 24, 30, 66, fig. 8, pl. II, figs. 6, 7.
- Hemiphyllodactylus margarethae* <sup>1)</sup>, BRONGERSMA, Résult. scient. Voy. Ind.

1) That this name was published was only partly due to the author. After the M. S. had been sent to press I examined more specimens and I came to the same conclusion as mentioned in the present paper. In the 2nd proof I made some corrections in the text to suppress the new name. The editor however left out the more important part of my corrections and changed the rest, although he had promised to make the necessary changes.

Or. Neerl., Verh. Kon. Nat. Hist. Mus. België, buiten reeks, V, fasc. 2, p. 11, pl. I, figs. 4, 5.

Head more long than broad, oviform. Snout as long as the distance between the orbit and the earopening or a little longer. The length of the snout varies from  $1\frac{1}{2} \times$  the diameter of the eye to  $2 \times$  that diameter. The earopening is mostly small oval and oblique, sometimes a little roundish. Its size is subject to a slight variation (MERTENS, 1930, p. 245). Rostral broad, nearly pentagonal, about twice as broad as high, with a median cleft or a notch above. The nostril is bordered by the rostral, the first upper labial, a supranasal and from one to three postnasals. When only one postnasal is present, this is very large, when there are two postnasals, the upper one is the larger in most specimens. The number of upper labials varies from ten to thirteen, the numbers eleven and twelve being the more frequent ones. Nine to thirteen lower labials, the more usual number being eleven or twelve. The symphysial is triangular or slightly pentagonal, but always rather narrow. It may be a little rounded posteriorly. It is bordered behind by small granules in most cases, some of these granules may be enlarged. The specimen from Bleeker's collection (n<sup>o</sup>. 4) has two pairs of distinctly enlarged chinshields, the median pair separated from one another by small scales. Two specimens from Fort de Kock (nrs. 12, 13) and two from Takengon (nrs. 14, 15) have two enlarged chinshields forming a suture behind the symphysial, they are accompanied by others varying in size and in number (BRONGERSMA, 1931, pl. I, figs. 4, 5). Taylor mentions a specimen from the Philippine Islands with only one large chinshield.

Body long and slender, covered above with small granular scales, those on the limbs somewhat larger. Limbs slender, the digits are very unequal, free and more or less denticulated. The inner digit is rudimentary; the inner toe sometimes with a weak claw. Subdigital lamellae in a double series, 4 to 6 lamellae, below the median toes. Ventral scales larger than dorsals, smooth, imbricate. Males with an angular series of 7 to 15 praeanal pores and sometimes 3 to 8 femoral pores separated from the praeanal ones. A continuous series of 38 to 40 pores may be present. In females the praeanal and femoral scales are sometimes pitted. These may be placed in different ways: 1<sup>o</sup> a continuous series of 37 pitted scales; 2<sup>o</sup> an interrupted series; 3<sup>o</sup> only the praeanal scales are pitted; 4<sup>o</sup> only the femoral scales are pitted.

The tail is cylindrical or rounded quadrangular in cross section, the tip sometimes flattened. It looks as if it were prehensile (already stated by ANNANDALE, 1912, p. 134).

Colour (in alcohol): Above light brown or greyish; a dark band from the tip of the snout through the eye on to the sides of the body. Another dark band begins behind the eye and is continued on the back. The bands are sometimes broken up into spots which may become confluent into irregular cross lines. On each side a series of roundish light spots from behind the eye on to the back between the dark bands of each side. Characteristic for all specimens are two light spots at the base of the tail. The tail is brownish above with lighter transverse spots. Lower parts of body whitish speckled with brown, or brownish. The tail is whitish below on the basal part, the rest is greyish or brownish. A female from Engano Island (n° 19) shows a different coloration (VINCIGUERRA 1892, p. 523). It is light brownish above with a dark brown band, beginning on the occiput and continued to the base of the tail; this band is bordered by still darker brown.

The colour in life is described by FLOWER (1896, p. 867) from Singapore specimens: "Above dark brown spotted with brick red and black. Black lateral line from snout to shoulder passing through eye. Light yellow spots on lips and behind eyes. Upper surfaces of tail red with brown marks. The under part of the body was purplish-brown, of the tail rusty brown and yellow, with minute black spots", and from Hawaiian specimens by SNYDER (1919, p. 24): "In life the whole body is slightly tinted with pink. The under parts from the throat posteriorly, including the legs, are pale yellow. In the younger specimens the tail is pale orange beneath. Where the tail has been reproduced the yellow colour stops short the lately acquired part being dark beneath. The throat is spotted with dusky."

The largest specimens examined measure:

|                   | ♀    | ♂    |         |
|-------------------|------|------|---------|
| head + body       | 43,5 | 40,— | millim. |
| length of head    | 9,5  | 10,— | "       |
| snout to forelimb | 14,— | 13,5 | "       |
| axilla to groin   | 23,5 | 21,5 | "       |
| tail              | —    | 32,— | "       |

The study of the different characters was undertaken with the idea that perhaps races or subspecies could be distinguished but the result was negative.

Distribution (fig. 1): Ceylon; Birma; Siam; Malay Peninsula; Singapore Island; Sumatra (terra typica Agam); Nias; Engano; Java; Bali; Soembawa; Borneo; Sulu Archipelago (Cancuman, Dipolod, Marongas, Bubuan); Philip-



Fig. 1. Distribution of *Hemiphyllodactylus typus* Blkr. The lines A—B and C—D mark the part of the Archipelago where the species has not yet been discovered.

pine Islands (Mindanao, Mindoro, Ticao); New Caledonia; Loyalty Islands; Tonga Islands; Sandwich Islands (Hawai, Oahu, Kauai).

As is shown in fig. 1, the area of the species is broken up into two

parts. On one side it occurs on the asiatic mainland and the western part of the Archipelago, on the other side on New Caledonia, the Loyalty Islands, the Tonga Islands and the Hawaii Islands. It has not yet been found on Celebes, the Moluccas, New Guinea and the more eastern Lesser Sunda Islands. STEJNEGER (1899) and SNYDER (1919) suppose that this species was introduced on the Sandwich Islands with the first inhabitants. This is of course possible as some other Gekkonids are obviously transported by man. It remains strange however that the species has not yet been discovered on Celebes, New Guinea or the Moluccas. As *H. typus* seems to be rather rare it may be only a question of time that the area will prove to be more continuous, though I do not think it likely. Another disjunction is to be found in the western part of the area, in southern India, where *H. typus* is replaced by *H. aurantiacus*. The genus and species seem to be of western origin. In S. E. Asia the genus shows its greatest development and variation.

MERTENS (1930, p. 245) caught one specimen on the verandah of the pasangrahan at Gitgit (Bali), while another specimen was taken by his collector under some dry leaves (Soembawa). TAYLOR (1922) mentions that all specimens collected by him were found under loose bark of trees at the sea side. The species seems not to be one that essentially lives in human dwellings. The vertical distribution shows a range from sea-level to about 1500 M. (Willis Mts., Java).

The eggs were described from the Philippine Islands by TAYLOR (1918, 1922), from the Hawaiian Islands by SNYDER (1919) and from Java by KOPSTEIN (1930 A). They measure from 5.6 to 6.6 millim. and were found under loose bark by SNYDER and TAYLOR, while KOPSTEIN discovered them in a cluster of bamboo stalks. The two eggs are cemented together. Newly hatched young have a total length of 29 millim.; they soon shed the epidermis and exhibited the colours of the adults (SNYDER).

### **Hemiphyllodactylus aurantiacus (Bedd.) <sup>1)</sup>.**

*Hemidactylus aurantiacus*, BEDDOME, Madras Journ. Med. Sci, n<sup>o</sup> 1, 1870, p. 33 (not seen by me); Stoliczka, Journ. Asiat. Soc. Bengal XLI, 1872, p. 99.

*Lepidodactylus aurantiacus*, BOULENGER, Cat. Liz. Brit. Mus. I, 1885, p. 164, pl. XIII, fig. 4; STRAUCH, Mém. Acad. Imp. St. Pétersb. (7) XXXV, n<sup>o</sup> 2, 1887, p. 27; BOULENGER, Fauna Brit. Ind., Rept. Batr., 1890, p. 98; SCHAEFER, Arch. Natg. 68. Jahrg. Bd. I, 1902, p. 35;

1) Synonymy not complete.

ANNANDALE, Journ. Proc. Asiat. Soc. Bengal, I, 1905, p. 91; F. SARASIN, Zool. Jahrb. Suppl. XII, 1910, p. 136; ROUX, Revue Suisse Zool. XXXV, 1928, p. 451, 468.

This species was recorded, with some doubt, by SHELFORD (Journ. Str. Br. Roy. Asiat. Soc. n<sup>o</sup> 35, 1901, p. 50) from Borneo. The record seems extremely doubtful to me; probably it was a specimen of *H. typus* Blkr. DE ROOIJ did right not to include the species in her book.

I have examined only two specimens so that I was not able to study the variation. Without any doubt it belongs to this genus and in my opinion it is a species distinct from *H. typus*. It has the first two or three pairs of subdigital lamellae very much enlarged. The symphysial is relatively much broader and shorter than in *H. typus*, it is broadly pentagonal.

Specimens examined:

1 ex., S. India, British Mus. Nat. Hist. Reg. n<sup>o</sup> 82. 5. 22. 8.

1 ex., Ceylon, Musée d'Histoire Naturelle, Bâle, n<sup>o</sup> 2899.

As far as I have been able to examine the literature on the herpetology of Ceylon, I have not yet found the species recorded from this island. The specimen had two transversely enlarged chinshields behind the symphysial and three pairs of large lamellae below the fourth toe. In the Basel Museum it was registered as *Lepidodactylus ceylonensis*.

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