

XLII. DESCRIPTION OF AN *AGRIOLIMAX*  
FROM GYANTSE, TIBET, COLLECTED BY  
CAPTAIN F. H. STEWART, INDIAN MEDI-  
CAL SERVICE, WITH DETAILS OF ITS  
ANATOMY

By *Lieut.-Col.* H. H. GODWIN-AUSTEN, *F.R.S., F.Z.S., etc.*

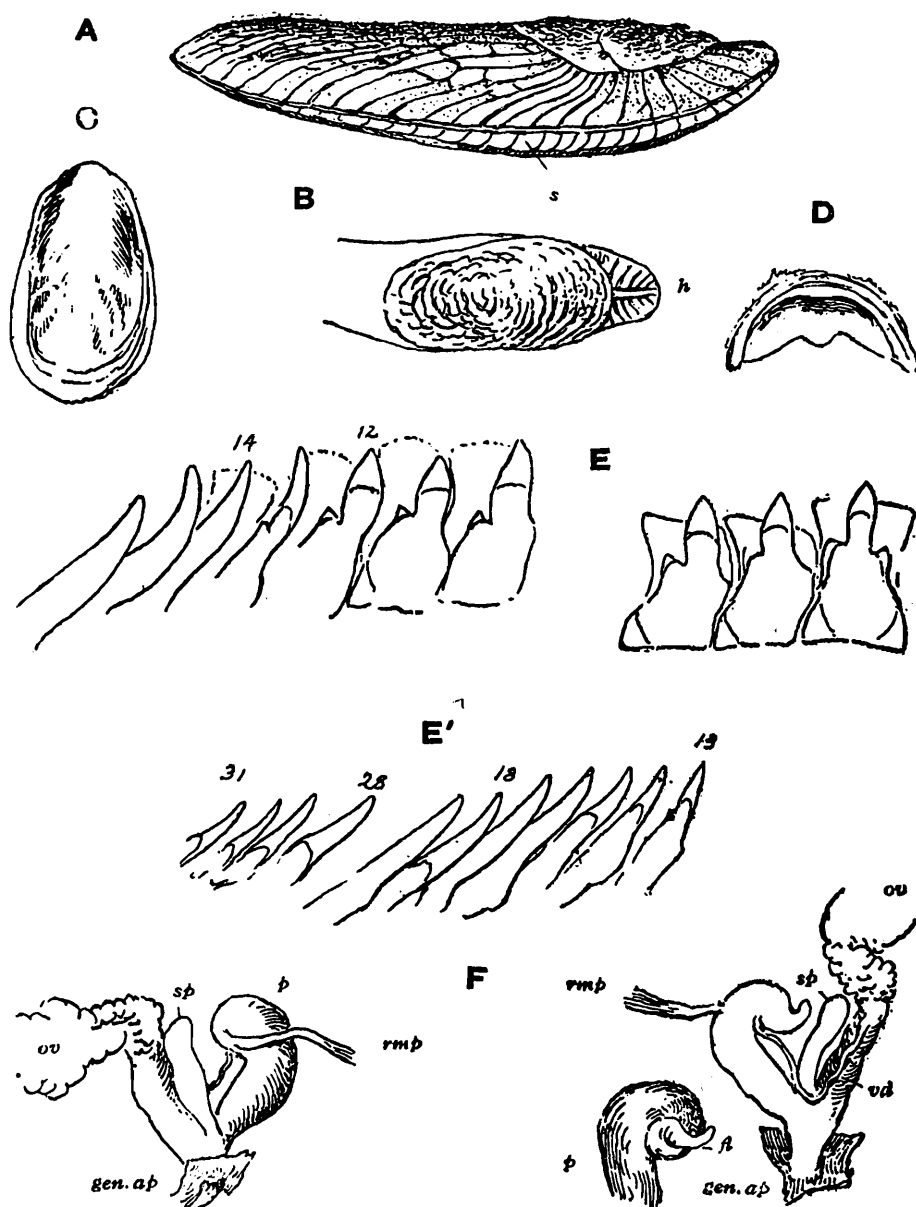
Some specimens of slugs have lately been placed in my hands by Dr. Nelson Annandale, Superintendent of the Indian Museum, Calcutta. Considerable is the interest attached to them because they were collected by Captain F. H. Stewart, I.M.S., on the 11th September, 1907, at Gyantse, in Tibet, at an altitude of 14,500 feet, and are the first slugs to have been obtained in that part of Tibet.

There were two tubes, one marked No. 88 containing two specimens, the largest of the lot, and another, No. 58, twelve specimens much smaller in size of a paler colour; colour, however, in spirit specimens is not of much value, and I can detect no difference in the outward form, nor in the groovings on the body of the large and small specimens, nor in the formula of the radula. The internal anatomy of the two largest was well seen and proves these slugs to belong to the genus *Agriolimax*, the nearest species being *Agriolimax campestris* var. *hyperborea*, as described in the Monograph of the Land and Freshwater Mollusca of the British Isles by Mr. John W. Taylor, p. 135,—a species with a northern habitat in both the Old and New Worlds. As I shall show further on, there are differences between the two, which, considering the very small differences which constitute varieties of *campestris* (such as *occidentalis*, Cooper, of California; *montanus*, Ingersoll; *castanea*, Ingersoll; *intermedius*, Cockerell; and *tristis*, Cockerell, of Colorado) I think render this Tibetan form quite worthy of similar distinction.

*Agriolimax tibetanus*, sp. nov.

Animal 17 mm. in length, pale umber brown in spirit; the mantle and dorsal surface of foot much darker, nearly black. The mantle is anterior in position and has semi-concentric foldings on the hinder part, concentric and given off from the right anterior edge on the fore part; two parallel grooves run down the top of the neck, which are joined on both sides by the main lateral grooves. These last on the side of the animal are very distinctive, deep and well defined; on the rounded dorsal side of the foot these lateral intervals are first broken up into parallelograms, and then, running closer together, form oblong

close-set tubercles. The sole of the foot is tripartite, and it has an edge of narrow elongate tubercles, and the outermost area of the sole is broken up into quadrate spaces corresponding in their length to the spaces between the lateral grooves. Tentacles black.



*Agriolimax tibetanus*, sp. nov.

- A = Animal viewed from right side,  $\times 3.6$ ; s. = sole of foot.
- B = Mantle viewed from above showing dorsal grooves,  $\times 3.6$ .
- C = Shell,  $\times 7$ .
- D = Jaw,  $\times 20.5$ .
- E = Teeth of the radula, central and admedians,  $\times 720$ .
- E' = " " " " laterals,  $\times 316$ .
- F = Genitalia,  $\times 7$ .

The internal anatomy showed that both the largest specimens (No. 88) were adult, the oviduct being large and jelly-like. The albumen gland was also large and of conspicuous ruddy brown colour, and occupied the posterior median portion when the animal

was removed from its enveloping integument. There were not enough specimens to determine the coils of the intestine, but the rectum was well seen. The retractor muscles of the eye-tentacles are situated on the posterior end of the mantle, and the branchial cavity, the heart lying on the anterior side.

The generative organs were well seen and mounted.

The penis is a simple, short, thick tube with a globose head giving off a small, tightly-coiled, what may be termed flagellum, or rather its homologue; the vas deferens joins it on one side and the retractor muscle on the other. The spermatheca is short, club-shaped, and lies close against the free oviduct. The vas deferens is very short. I could not find any *excitatory* organ, which Semper shows exists in *Agriolimax laevis* (*vide* p. 122, Moll. British Isles). The generative organs are of the same type, only differing in minor details.

The peculiar character of this species is the strong lateral grooves on the side of the foot, running from the peripodial groove upwards. Taylor's description of *Agriolimax agrestis* does not apply to this species. The teeth of the radula are similar in form to those of *Agriolimax hyperborea* (Westerland); the laterals being curved and aculeate, but there are far fewer of them. I got the radula out in a very perfect state, and the formula is 17.2.12.1.12.2.17. or 31-1-31; in *hyperborea* it is 42-1-42, laterals 12 in number, marginals about 30; it shows the two species are very close to one another.

Jaw moderately arched with a small central projection.

Shell thin, glassy, transparent, milky white, flat, elongately ovate, widening in breadth gradually to the anterior edge, with a rounded apex.

[NOTE.—The specimens described above by Colonel Godwin-Austen were found under stones in a small mountain stream at High Hill Gompa. The smaller specimens (from tube No. 58) were taken on the 16th July, the larger (tube 88) on the 11th September. On the 29th March I had found under stones in the same locality two eggs which presumably belong to this species. They were spherical, 2 mm. in diameter, and had very thick, tough, laminated, membranous shells. Floating loose in the cavity of the shell was an embryo in an early stage of development, roughly spherical and showing a differentiation into a thin outer layer and an inner cellular mass. These two eggs were placed in water in a tube and kept in a room of the Trade Agency at Chang-lo. On the 10th April the embryos had begun to assume a slug-like form, but they showed no haste to break through their shells, and it was not until the middle of May that they introduced themselves to the outer world. Although this collecting-ground was regularly visited, no adult slugs were found until July.—F. H. STEWART.]