

## NOTES ON THE VICTORIAN SPECIES OF *BULLINUS*.

BY

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(Plates I-II.)

Those fresh water snails once known in Australia as *Physa*, but now referred to as *Bullinus*, have recently acquired an unpleasant interest. For the spread and nurture of hæmaturæ, a severe, painful and incurable complaint, has recently been traced to Egyptian representatives of *Bullinus*.

The newly hatched embryo of a Trematode, called *Bilharzia*, enters the *Bullinus* snail and there turns into a sporocyst. Then Bilharzid cercariæ are discharged from the infected snail every day for weeks, more plentifully and continuously in summer. The free-swimming larvæ swarm on the surface of the water in search of a victim. Should they fail to find a host within forty-eight hours they must die. A successful parasite enters the human body either by the mouth or through the skin, and proceeds to establish itself in the rectum or bladder. Arrived at maturity, the parasite sheds innumerable hard-shelled eggs. These erode the mucous membrane, thus causing internal bleeding, a symptom of the disease. Victims may even die from necrosis of the liver or blockage of portal veins.<sup>1</sup>

It is presumed if this plague were to be introduced into the Commonwealth from Africa or Asia that the Australian species of *Bullinus* would be ready at any time or place to serve as an intermediate host and so transmit it. Previously an Australian *Bullinus* had been indicted as an intermediate host for the sheep fluke.

The genus thus acquires an importance for medical and official circles. Hence the demand on Conchologists for exact determination of these shells and the present effort to improve the unsatisfactory current nomenclature and identification.

In 1881, a Catalogue of Australian and Tasmanian Freshwater Shells was published by Prof. R. Tate and Mr. J. Brazier.<sup>2</sup> They enumerated fifty-four "*Physa*," more, as they point out, than half as many as were recorded for the whole world. They remarked on the unsatisfactory and indefinite knowledge of these species. In the following year, but without acquaintance with his predecessor's paper, Mr. E. A. Smith, of the British Museum, revised the Freshwater Shells of Australia. With additions proposed by himself he included fifty-two of "*this neglected group*" of Australian "*Physa*;"<sup>3</sup> but he thought that if his revision had been more complete, several species would be found endowed with a super-abundance of names.

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<sup>1</sup> R. T. Leiper—Proc. Roy. Soc. Medicine, ix., 1916, pp. 145-172.

<sup>2</sup> Tate & Brazier—Proc. Linn. Soc. N.S.Wales, vi., Dec. 1881, pp. 552-569.

<sup>3</sup> Smith—Journ. Linn. Soc. Zool., xvi., April, 1882, p. 275.

Induced by these expressions of discontent, Mr. A. H. Cooke undertook an enquiry,<sup>4</sup> "On the Generic Position of the so called *Physa* of Australia." He noted several probable synonymic assemblages of the species. On higher taxonomic levels he showed by radula characters that this group should be eliminated from *Physa* and linked with *Planorbis*. For its generic name he selected *Bullinus* proposed by Adanson in 1757. Unluckily for that conclusion, Adanson was a pre-linnean and not a binomial writer; his nomenclature is, therefore, ineffective. Apparently the place of *Bullinus* may be taken by *Bullinus* which according to Herrmannsen, was duly proposed by Oken.

Chiefly on the evidence of the radula, Cooke classifies *Bullinus* as "not so much a sinistral *Limnaea* as a spiral *Planorbis*." Reference of *Bullinus* and *Isodora* to the family Planorbidae is further supported by the ciliated epidermis and by the filiform tentacles figured by Lesson,<sup>5</sup> Tate<sup>6</sup> and Cobb,<sup>7</sup> as well as by the non-digitate mantle figured by Chapman.<sup>8</sup>

This group presents the student with exceptional difficulties. The species appear to vary extremely and to limits not yet ascertained. With the honourable exception of Tate's essay in the Zoology of the Horn Expedition, the literature has multiplied names and ignored variation. In the present state of a world war the usual help from correspondents, such as comparison of specimens or drawings, cannot now be obtained. When a time of peace comes it will be necessary to institute a fuller comparison between our species and their reputed types abroad. Thus no positive conclusions are advanced and the matter that follows is presented rather as a means to further inquiry than as the finished result of investigation.

A chance handful from any pool is likely to present individuals with a longer and with a shorter spire. The first lesson to be learnt in studying this group is how changeable a character is this elevation of the spire. The presence or absence, spacing or punctuation, of spiral sculpture, can not be used as a safe guide to specific differentiation. These features are the imprint of spiral threads or lines of ciliæ in the epidermis. But the epidermal coat varies in development according to local conditions, so that lines of ciliæ, which would apparently be otherwise developed, seem to be repressed in unfavourable environment. Yet some geographical series suggest that there are species which never develop such ciliæ.

A more abundant supply of lime allows a deposit on the inner lip and hence longitudinal streaks that mark previous rest stages.

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<sup>4</sup> Cooke—Proc. Zool. Soc., 1889, pp. 136-143.

<sup>5</sup> Lesson—Zool. Voy. Coquille, 1826, pl. xvi., fig. 5.

<sup>6</sup> Tate—Horn Exped., Zool., 1896, pl. xix., fig. 25.

<sup>7</sup> Cobb—Agric. Gazette N.S. Wales, ix., 1898, p. 182, fig. 2.

<sup>8</sup> Chapman—Mem. Nat. Mus. Melb., v., 1914, pl. i., figs. 2-3.