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A REMARKABLE DEVELOPMENT OF PSEUDO-SCULPTURE ON A BIVALVE

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Through the kindness of Mr. D. Thaanum of Honolulu, I have been privileged to study and report upon a very remarkable bivalve, *Samarangia quadrangularis* Adams & Reeve (Veneridae), dredged by Dr. Thaanum and D. B. Langford off the Loo Choo Islands, Japan.

This species is encased by agglutinated shell sand which completely covers the entire outer surface of the shell, formed as well into a very definite sculptural arrangement. This agglutination not only covers the shell with a thick layer of cemented particles, but, in addition, produces radial sculpture of high nodules that are strikingly similar to those occurring on many species in the Pectenidae, Unionidae and other strongly sculptured lamelli-branches.

The posterior portion of the disk supports the strongest development of the radial ridges of nodules, and these extend beyond the margin of the valve but are even with the valves when the shell is closed. Under a low power magnification ($10\times$), the minute sand grains appear to be concentrically arranged, and are shingled or slightly overlapping (pl. 6, fig. 4).

Mr. Thaanum cleaned off the cemented sand grains on one valve of the larger specimen (pl. 6, fig. 1). The cleaned surface is shining with a minute and normal sculpture of very fine concentric growth lines. The opposite valve remained as originally found (pl. 6, fig. 2).

The smaller specimen (pl. 6, fig. 3) was dredged in 15 fathoms off Kowan, the larger specimen in 40-50 fathoms off Itoman; both localities are on Okinawa Island, Loo Choo Islands, Japan.

Measurements (including the pseudosculpture)

Height	43	Length	61	Width	30 mm.	(M.C.Z. no. 141603)
"	16	"	21	"	11 "	(Thaanum collection)

REFERENCES

Venus quadrangularis Adams & Reeve 1850, Voyage of H.M.S. Samarang, Zoology, London, p. 79, pl. 24, fig. 7 (Corean Archipelago); L. Reeve 1864, Conch. Icon. 14, *Venus*, species 129.

Samarangia Dall 1902 [section under *Venus*] Proc. U. S. Nat. Mus. 26, p. 361, type, *Venus quadrangularis*; Thiele 1934, Handb. Syst. Weichtierkunde, 3, p. 885 [as a genus].

J. E. Gray (Ann. Mag. Nat. Hist. (2) 4, p. 296, 1849) mentions the development of siliceous spicula superimposed erectly upon the normal periostracum of the shell in the genus *Trigona* [= *Tivela*] which forms a plush-like surface. He believed that these spicula were produced by the mollusk and not those produced by a commensal sponge, a belief held by certain of his colleagues. However, regardless of these two opposed views, our present case is still different inasmuch as the production of the pseudosculpture is the employment of a foreign substance by the mollusk itself and not, as in Gray's view, a production of the mollusk or, the view held by his colleagues, the production of a substance by a commensal organism upon the outer surface of the shell.

It would appear that the original specimen described by Adams and Reeve was devoid of this sculpture as no mention is made of it. The specimen obtained was either dead or perhaps subsequently cleaned before Adams and Reeve saw it.

Certain land snails, especially in the Sagdidae (*Thysanophora*), cement foreign particles to the outer surface of the shell, possibly to offer protection by modifying the contour of the shell outline. Also, in the case of *Xenophora*, among the marine snails, the cementing of other shells, small stones and even coal and cinders, is very well known.

It is rather interesting, however, to note that this present condition is to be found in a family perhaps most outstanding among the marine bivalves for their elaborate sculptural development; that the mantle, so adept in producing many shell structures on the outer surface, is also capable of building a pseudosculpture composed of a foreign material.

A PSYCHIATRIST'S NOTE ON SHELLS

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The collection and study of shells is a valuable form of occupational therapy and, properly introduced, can be a helpful adjunct to some forms of psychotherapy. Shells should be more widely utilized in these fields for the pleasure and interest they afford.

I believe that shells should be much more widely collected and studied by people, and that conchology should be more broadly and more generally applied on account of the psychological and social values inherent in its application. For example, I have found that certain tired, nervous and discouraged patients can find relaxation, recreation and enjoyment in collecting and studying shells. Some invalids and sick people who might otherwise be bored or irritable find considerable satisfaction and delight in conchology, once they are introduced to that subject and are helped and guided in developing their interest in it. Every sick child should be offered a box of shells to play with and should be given some instruction or a simple book to explain them. Shells are good for the mind, for "nerves." Buonanni was aware of this in 1681 when he published his book, "The Recreation of the Eyes and of the Mind through the Observation of Shells."¹ The ideas he expressed are basic to all scientific pursuits and are as valuable now as they were then, or more so, and certainly now they are more needed, and more applicable, than ever before, especially in a complex and competitive society.

The relations between science and society are extremely important. This fact should always be remembered when we think of the science of conchology—for we are too much inclined just to consider conchology as a science apart, to think of it in terms of itself, by itself and alone, and this is not really constructive.

There is no such thing as a pure science, pursuing its ideal

¹ "Ricreatione dell' Occhio e della Mente nell' Osservation' delle Chioccioline" Proposta a' Curiosi delle Opere della Natura dal P. Filippo Buonanni della Compagnia di Giesù Con quattrocento, e cinquanta figure di Testacei diversi, sopra cui si spiegano molti curiosi Problemi In Roma, per il Varese, MDCLXXXI con licenza de' Superiori.

course in a social vacuum. Shells exist certainly, but so do people and without people shells would be lying on the bottom of the sea—or in the stomach of an otter or a codfish, or would be ground to nothing on a beach unseen. It is the social or human interest in shells that has made conchology what it is today—man's curiosity applied—and this interest should always be kept actively alive (if conchology is to become a socially useful science in the fullest sense) by means of exhibits, museums, by teaching and lectures, and by the giving of shells to children and to others who might be interested in them—sick people, for example, or persons who are bored and need a hobby or special interest that affords opportunities for scientific development and social relaxation.

There is really no sharp or essential distinction between pure and applied science, although these terms still have a useful practical application and are convenient for us to use conversationally or as pegs or handles to help us deal with our thoughts.

The cruder forms of the doctrine of economic determinism should not apply to the science of conchology any more than they do to other human activities, or less, if anything, for shells are easy to find and, generally speaking, are cheap compared with other kinds of the world's goods. I know of no greater "value" than one gets in a 25-cent shell. It could not be reproduced for that sum. Beaches are accessible for millions of persons and the haunts of the land snails are accessible to all who will walk outdoors. As to shell dealers—"I often wonder what the vintners (shell dealers) buy, one half so precious as the wares they sell." Where can you get anything, or what can you get to compare with the beauty and wonder-making quality of a shell?

Just as science in general is a social function, so should the science of conchology in particular be a social function even though it also has its own momentum and is an activity which can be pursued for its own sake.

Conchology, in its own way, sets forth some of the essential facts about biology. Conchologists have an opportunity to develop our knowledge of certain basic facts and ideas in their relation to social life, and in the hands of the more inspired and dynamic leaders in conchology this has been done and it can be

done again in a pithy and illuminating manner. Witness the rich and choice diversion and instruction the literature on conchology can offer one who is willing to take the time to read it. Pilsbry's writings, for example, or Bartsch's papers, or those of Tryon or Sowerby, or any number that could be named offer us more than any one man can take in in his lifetime. We should be grateful to these men for pointing out to us what they have observed and for what they have suggested to us by their observations and reports. All these bear a direct relationship to general science and human activity as well, and many of the points they make and the inferences they draw are applicable to us in terms of our own life. Biology has much to say in explanation of human activity. Biology supports philosophy and psychology in the efforts of these branches of knowledge to explain human behavior. Man is such a peculiar organism that his behavior needs a special set of categories for its description over and above those of biology, but we can begin with biology and profit by so doing. Of course we realize at the beginning the limitations of biological explanations for human activity. But, nonetheless, biological categories are basic for human affairs and it is useful to have them so clearly set forth as conchology can begin to set them forth. I know of no point where a scientific education can better begin than by an introduction to conchology. Science and sanity, science and mental health are deeply related. Conchology should be more widely introduced and more widely utilized in teaching and recreation and in therapy. I hope a day may come when the educational system of this country has been revised to take conchology more actively into consideration. Conchology should be a more important part of the educational programs of secondary schools. Science courses and nature projects in high schools and colleges should be altered to include conchology as a basic unit of practical study. Conchology is a branch of the tree of knowledge that is strong and beautiful enough to attract and hold the interest of the student. Any parent, or teacher, or physician who has wit and intelligence enough to try this out for himself will find that the bough is still golden, and every conchologist is fully aware of that fact.



Clench, William James. 1942. "A remarkable development of pseudosculpture on a bivalve." *The Nautilus* 55, 73–77.

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