remains imperforate as before, and is beyond the reach of surgical remedy. It may be added, that the subject of this history recognizes an increase of sexual feeling at and soon after the periods of enlargement of the ovary.

The second case was that of a young woman who had attained the age of twenty without having menstruated. She was a tall, strumous-looking person, in weak health. There had not been any well-marked efforts at menstruation, but she had suffered slightly from lumbar pain. The mammæ were well developed. The pelvis was fairly formed. On examination I found the two ovaria just appearing beyond the external abdominal rings, and readily returning by pressure into their respective inguinal canals. They were of equal size and similar shape, being ovoid bodies about the size of small chestnuts. They were not tender when touched, although organically sensitive, and she had never experienced pain in them. The external sexual organs were somewhat less perfectly developed than usual; the vaginal orifice was closed, and no trace of a canal or uterus could be detected by exploration with a catheter in the bladder and the finger in the rectum. These organs, as in the former case, were absent. During the time I saw the patient, which was only for two months, the ovaria did not enlarge, although her general health improved.

II. "Further Observations on the Anatomy and Physiology of *Nautilus*." By JOHN D. MACDONALD, Esq., Assistant Surgeon R.N. Communicated by Captain DENHAM, R.N., F.R.S. Received January 13, 1857.

Both Professors Owen and Valenciennes noticed that the hollow subocular process of their specimens of *Nautilus Pompilius* was not tentaculiferous, and I may be permitted to say that this was also true of several examples of *Nautilus Pompilius*, and one of *N. macromphalus*, examined by me. But there is still another matter worthy of remark with reference to this process, namely, that its cavity may be traced downwards, inwards, and a little forwards, to within about the twentieth of an inch of the auditory capsule; indeed it would

appear as though provision had been made for the entrance of sonorous waves through a rudimentary external ear.

There can be little doubt that the eye itself is a modified tentacular sheath, so fashioned and endowed as to become the seat of the special sense of vision; but the subserviency of such a part to the faculty of hearing is much more obviously seen in the subocular process just noticed, which holds an intermediate position between the organ of vision and the tentaculiferous sheaths protecting the proper organs of touch.

In a figure which accompanies this communication, the auditory sac is exposed by an incision made in the groove between the funnel-lobe and the base of the tentacular sheaths. The subocular process is slit open to the bottom of its cavity, so as to show its termination in close proximity to the ear-sac. The interior of the tube is lined with a glandular membrane thrown into small folds, disposed longitudinally, but the exterior of the process is quite smooth like the rest of the integument.

I have often had some little difficulty in detecting the otolithes or otoconia, as the case may have been, in gasteropods long immersed in spirits or other preservative fluids; but in a specimen of *N. Pompilius*, kept for many months in strong gin, although the soft parts were far from being well preserved, I was enabled at the first attempt to remove the contents of the auditory sacs, and the minute elliptical otoconial particles, identical in character with those of *N. macromphalus*, were very distinctly seen under the microscope.

In a former paper, I first noticed my discovery of simple auditory capsules in, as I then supposed, the *N. umbilicatus*; but I find that I have incorrectly named my specimen, for on comparing the shell with the drawings of the several existing *Nautili* given in Sowerby's 'Thesaurus Conchyliorum,' it agreed exactly with the figure of *N. macromphalus*. I am indebted to my friend Mr. S. Stutchbury for the perusal of the work referred to, and my error is sufficiently accounted for by the scantiness of my own library.

With reference to the action of the great lateral muscles of *Nautilus*, the following ideas have suggested themselves to my mind.

As though preparatory to the complete separation of the body of the Cephalopod from the shell, which is usually present in the lower genera, the fasciculi composing the lateral muscles in *Nautilus* do not

perforate the mantle, and therefore cannot be directly fixed into the shell; they are, however, connected with it through the medium of thin filmy layers of a corneous texture, which frequently remain attached to the shell after the animal has been removed. The feeble hold of those muscles, even in a very recent state, is thus readily accounted for. Indeed, it is highly probable that the fixity of the body of *Nautilus* during the inhalation and forcible ejection of the respiratory currents is effected by the shell-muscles reacting upon one another, on the principle of a spring purchase, rather than by simple traction, as illustrated by the withdrawal of a gasteropod within its retreat, or the closure of the valves of a conchifer by the adductor muscles.

This view, which is supported by the foregoing facts, has its principal basis in the line of direction of the shell-muscles, and the angle at which they meet one another, at the root of the funnel-lobe; for the outer extremity of each being fixed, it follows that the first effect of the contraction of the muscular fibres would be to increase the angle just noticed; and this cannot possibly be accomplished, according to the recognized laws of muscular action, without tending to throw apart the points of origin, or in other words, exerting outward pressure against the internal wall of the shell, and thus, as it were, jamming the occupant tightly in its cell.

The action of the great lateral muscles of *Nautilus* here supposed, affords a remarkable contrast with the mode in which the posterior expanded arms of Argonauta embrace the exterior of its shell, particularly during the ejection of the expiratory current; while the withdrawal of the gasteropod into its abode, by the contraction of a veritable retractor, exhibits the exertion of muscular force in a very different direction.

In regard to the supposition that *Nautilus macromphalus* is the male of *N. Pompilius*, I may remark, that, besides my own specimen of the former, which proved to be a female, another, in very excellent condition, lately deposited in the Sydney Museum, is of the same sex.