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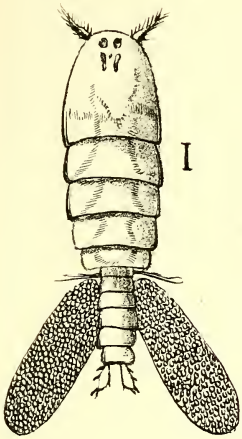
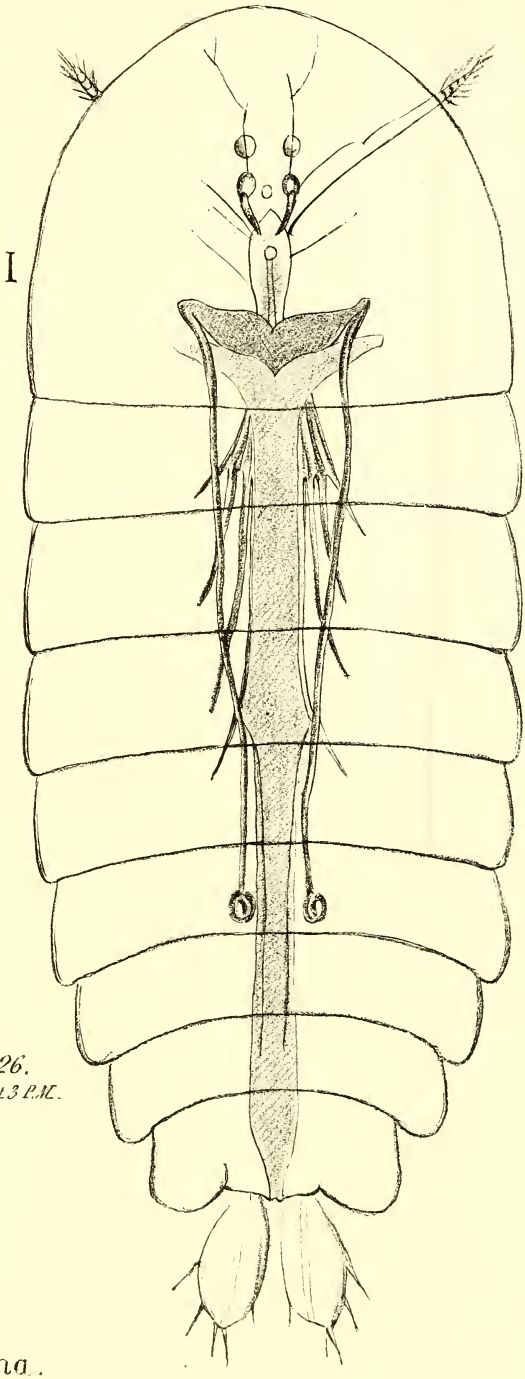


I

Natural Size × 8.

Natl Size × 8.

Sapphirinae *Caught 1883, Jan. 26.*
In 40° 40' S & 17° 35' E. about 3 P.M.



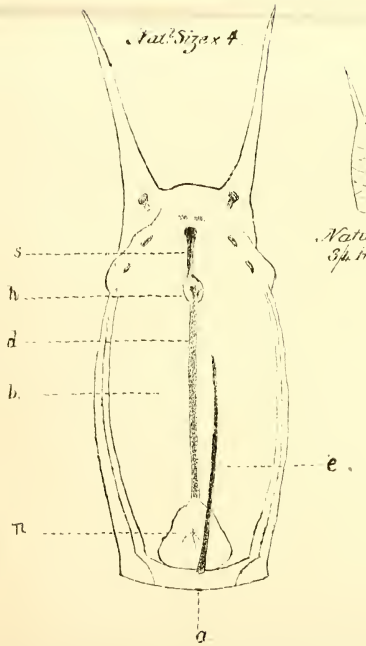
I

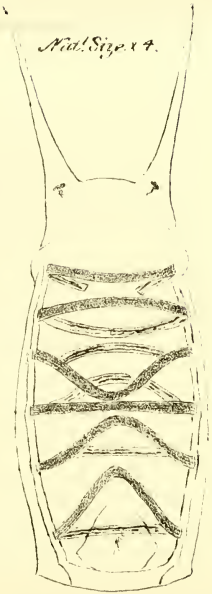
Sapphirina Gemma.

J. D. Dana.

Crustacea, Pt. ii. P. 1252.
Atlas Pl. 88. Figs 1 & 2.

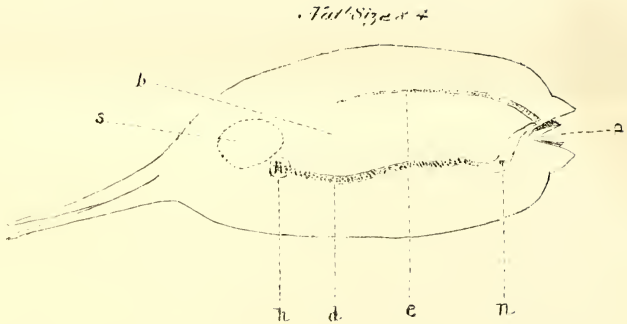
Salpa democratica

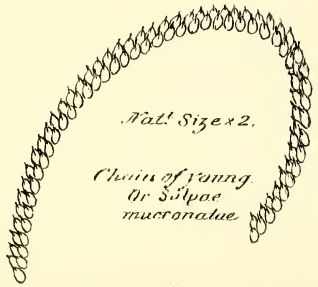




Muscular System

One of the Posterior Processes





S: Democratica Caught 1883 Jan. 26.th about 3. P.M.
In 40.° 40' S. 17.° 35' E. S. mucronatae
Expelled from S. dem.r by 9 a.m. following day

a ..... Anterior opening
b ..... Branchial or Pharyngeal Cavity
d ..... Dorsal Bloodvessel
s ..... Place of the Nucleus containing digestive organs
e ..... Endostyle
h ..... Heart
n ..... Nerve ganglion - eye spot.

NOTES ON A SAPPHIRINA AND A SALPA CAUGHT OFF THE CAPE OF GOOD HOPE.

By John McCance, F.R.A.S.

[*Read August 11th*, 1884.]

In offering the following notes to the Royal Society of Tasmania, I must apologise for the paucity of original observation which will be apparent, and plead as my excuse my hope that they may arouse a little interest in the less conspicuous forms of oceanic life, of which I believe the seas round Tasmania contain a number of interesting species.

When I captured these animals I was a passenger on board the ship Invercargill, Captain John Muir, then on a voyage from London to Port Chalmers, N.Z. At noon on January 26, 1883, the ship's position was 40° 38′ S., and 17° 30′ E., and from the following day's run and position, I calculate we were in 40° 40′ S., and 17° 35′ E., at the time when I obtained these specimens. The day was dull, but not cold, and the temperature of the sea, as taken by the mate, was higher than on preceding days. Unfortunately, I did not make a note of the exact temperature, but I imagine we were passing through one of those patches of warmer water which have been remarked to the southward of the Cape of Good Hope. Nothing unusual was noticed in the appearance of the sea, which was calm, until the afternoon, when the water was filled with brilliant blue stars, floating past the ship in great numbers. With a small canvas bag I succeeded in fishing up several of the blue stars, which were a species of *Sapphirina*, and two or three other animals, non-luminous, one of which was a *Salpa democratica*. I kept them in a glass of sea water till the 29th, when an unfortunate accident killed them, and having only a small magnifying glass, I was prevented from making a full examination of all. I preserved the sketches I was able to make, and through the kindness of Mr. Morton, of the Royal Society's Museum, I lately received from Mr. Haswell, of Sydney, information as to the species and construction of the animals depicted.

The two small crustaceans correspond so closely with the descriptions and drawings of the male and female of *Sapphirina gemma*, as given by J. D. Dana ("Crustacea," Part II., pp. 1252-3 ; Atlas, Plate 88, figs. 1 and 2), that I am very confident that they are individuals of that species. Dana's specimens were caught on the Agulhas Bank, South of the Cape of Good Hope, in 1842, April 11 and 12, and he notes that a *Sapphirina* of probably the same species was caught 12 miles N.E. of New Zealand. He specially notes the brilliant blue reflections of the male, the water on the Agulhas Bank being spangled with them for several hours. The male is about $\frac{1}{8}$ of an inch long, and $\frac{1}{16}$ of

an inch broad, and its body is composed of ten segments, the last being almost absorbed in the ninth, which again is much smaller than the eighth. Its activity was remarkable, and its motion sinuous, like that of the Sole. The female is about $\frac{1}{8}$ of an inch long, and $\frac{1}{24}$ of an inch broad; its cephalothorax has five joints, and its abdomen six. On either side of the abdomen, and springing from the junction of abdomen and thorax is a bag of very numerous small eggs, about $\frac{1}{24}$ of an inch long, and $\frac{1}{60}$ of an inch broad, of an elongated egg-shape. The female, like the male, was extremely nimble and active, and swam swiftly round and round the glass. The eggsacs, while the animal was in motion, were made to rapidly approach and recede from one another, thus appearing more like organs of locomotion. Both sexes appeared to me to have a finely granulated exterior, and a uniform dull lavender colour. In the head of each were a pair of elongated bronze red specks, the eyes according to Dana.

The other animal which I examined was one of those very curious Tunicates, the *Salpae democraticae*. This Salpa, Mr. Haswell writes me, "develops no sexual glands, but give origin by budding to a chain of young"—*Salpae mucronatae*—each differing considerably from *Salpa democratica*. These remain, through life, united in a chain, and "each when adult develops a single egg from which a *Salpa democratica* is developed." The solitary Salpa which I had the good fortune to capture, contained, when caught, a chain of young which were distinctly visible through the transparent body of the Salpa, curled round at the posterior end of the internal cavity. Next morning, when daylight permitted a more detailed examination. I found the chain of 80-90 minute *S. micronatae* just escaping from the *S. democratica*, the last pair of the chain becoming detached a few moments after I got them under observation. This chain consisted of a double row of animals, so small that with my inferior magnifier I could only see them as egg-shaped transparent masses, about $\frac{1}{24}$ of an inch long, with a purple knob at one end and a purple streak in the interior. The chain was about $1\frac{2}{3}$ of an inch long, and floated with the purple knobs uppermost, in a curved shape, which varied as the individuals performed their occasional simultaneous contractions.

The *Salpa democratica* was about $\frac{1}{2}$ an inch long, or $\frac{3}{4}$ of an inch, if the tapering conical processes at the posterior end are included. Its breadth was about $\frac{1}{4}$ of an inch, and its shape that of a barrel, or square-ended egg. The tunic was perfectly transparent, and the whole animal colourless, except the main parts of the nervous system, which were of a beautiful purple, and a few spots of a similar purple, which were, I believe, parts of the digestive and reproductive organs. The

integument of the body, as viewed from above, below, or one side, appeared distinctly to be composed of several layers, caused, as Mr. Haswell informs me, by the outer covering being of quite different substance and consistency from the rest. A series of six narrow ribbons, finely striated longitudinally, and lying apparently in one of the inner layers of the integument, formed an efficient muscular system. About once in five seconds, as far as I recollect, they were slowly contracted and more rapidly expanded, the resulting expulsion of the water in the interior cavity producing a forward jump of about an inch. The sixth band, or ribbon—that nearest the processes at the posterior end—did not completely encircle the body, but was interrupted for a space of about one-sixth of its length, on the dorsal side of the animal—by that I mean the side which was generally uppermost as the Salpa floated, and is opposite to that from which the posterior processes spring. The fifth and fourth bands touched on the dorsal side; the fourth, third, and second similarly lay in close juxtaposition on the ventral side.

The water which is ejected by these muscular bands is admitted by a wide orifice, with projecting thick lips, situated in the middle of the anterior end of the Salpa, and these lips were continually and regularly opening and shutting. I was able to make a sketch of the orifice, but did not arrive at an examination of the posterior one, which lay somewhere about the long processes. Just behind the anterior orifice, and making an angle of about 45° with the plane dividing the dorsal and ventral halves of the animal, was a roughly triangular purple vein or thread, having in the centre of the space enclosed a purple dot, with a few fine radiating purple lines. These, according to Mr. Haswell's letter, are the nerve ganglion and eye spot. From the centre of the base of the triangular nerve, and running along the dorsal side of the internal cavity of the Salpa is the endostyle, which is purple in colour, and about $\frac{3}{10}$ of an inch in length, or $\frac{3}{5}$ of the length of the Salpa's body. From the apex of the triangular nerve is a similar purple vessel, running in an irregular curve back to the posterior end of the animal. This is the main blood-vessel, and close to its further end lies the heart. The heart struck me as very remarkable, and I spent some time in watching it, and noticed that the membranes in it flapped for a period, then paused, then flapped differently, then paused, then flapped as before. I did not then know that these Tunicates have a heart which first drives the blood forward for a certain number of beats, and then backward for a corresponding number. I further noticed a number of globules in the blood thus driven to and fro. This was all of the interior that I had the opportunity of observing and drawing.

The two posterior processes to which I have referred were apparently of the same substance as the outer tunic. They were broadly conical at the base, which was about $\frac{1}{3}$ of their total length; the outer $\frac{2}{3}$ were very much finer and narrower, and covered with minute dots, which, Mr. Haswell says, were probably minute spines. In the interior of the base of each was a very strange mushroom-shaped object, of which Mr. Haswell says he does not know its precise nature, though he knows it to be as I described in my letter to him. When I sketched the process, or horn, I noted the mushroom-shaped object as coloured metallic green, but if I recollect right it was of the same bright purple as the nerve ganglion, etc., when the animal was first caught.

I have not been able to find any detailed account of the Salpae in the Society's Library, but in the Proceedings of the Boston Society of Natural History, Vol. XI., p. 17, is a detailed description, with woodcuts, of *Salpa Cabotti*, by Alexr. Agassiz. This is found south of Cape Cod, and very closely resembles the one I caught, and the description and investigation into the connection of the chain forms are highly interesting.

CANCER IN CATTLE.

[Paper read before the Royal Society of Tasmania August 11th 1884,

By H. A. Perkins M.D., Edin.]

The subject of disease in cattle is one which cannot fail to interest all sections of the community, as well the stockowner who provides for the market as the inhabitants of towns who consume the meat, and to whose advantage it must be to obtain the most wholesome supply of food. At a time when cancer among human beings has *been said to be on the increase, the nature of such disease among cattle not only merits attention at the hands of veterinary surgeons, but furnishes material for speculation to medical men. For in these days of minute organic life, of micrococci and bacilli, at a time when so many diseases find advocates for their origin and development in the theory of contagious living organisms, it might be a fair deduction to draw that the disease in man derived its prevalence and potency from living spores transmitted from the diseased meat which we colonists so unsparingly consume. The more especially as specimens of such disease called cancer in cattle areneither few nor hard to find, and the description of Osteo Sarcoma which I am about to give, is based on examples obtained in Tasmania. " The time has

[*Statistics of last 14 years show that though there has been an increase in the number of deaths from this cause, yet that the population has increased in nearly the same ratio.]