I have little doubt of this small fly being an Anthomyia, but as neither of the specimens had any setæ to the antennæ, I cannot determine the genus with certainty.

*Gen. 1293.—SCATOPHAGA. (*Meig.*)

33. *Apicalis.* Cinereous, very pubescent, face, apex of abdomen, and legs, castaneous.

Male, four lines two-thirds long, eleven broad; *female*, four lines long, nine broad.

Male. Cinereous, thickly clothed with fine long brown hairs, especially the abdomen and legs; antennæ blackish, two basal joints rufous, seta slightly pubescent only; lip horny and black; head with a furcate space before the crown, the face and palpi reddish-orange; thorax with a double ash-coloured line down the middle, and an obscure one on each side; abdomen elongate-ovate, with the margin of the third segment, and the following joints, entirely ferruginous; wings tinged with yellow, the costa and base of a much deeper and brighter colour, the nervures ochreous, excepting the two transverse ones, which are fuscous, and suffused, as well as the longitudinal ones connecting them; halteres and legs pale castaneous.

Female much less hairy, especially the abdomen and legs, the former being ovate, the second segment sometimes having the margin ferruginous, and a greater portion of the third, as well as the apex, of the same colour.

A male and two females of this handsome species were preserved.

34. *Fucorum.* (Fall.) "Obscure cinereous; thorax with four black lines; palpi, antennæ, and legs, black."—*Meig.*

Male, length three lines, breadth six lines; *female* rather smaller.

Meig: Syst. Besch.—vol. v., p. 253, n. 14; tab. 45, f. 29.

This insect is common in Sweden amongst seaweeds, from which circumstance Fallen has named it *Fucorum.* Commander Ross brought home a pair of flies that agree so well with the above description of Meigen, that I consider them identical.

* Curtis's Brit. Ent.—vol. ix., fol. 405.

MARINE INVERTEBRATE ANIMALS.

The following account of the Marine Invertebrate Animals, inhabiting those parts of the Arctic Ocean visited in the course of our late expedition, is very incomplete owing to nearly the whole collection having been necessarily abandoned with the Victory. Some few, however, of those that were considered to be most interesting, as forming the types of new genera, were brought by us to England, and specimens of each have been deposited in the valuable museum of the Royal College of Surgeons.

The arrangement and generic characters adopted in this notice, is that of Latreille in the last edition of Cuvier's "Règne Animal."

CRUSTACEA—DECAPODA.

1.—CRANGON BOREAS.

CRANGON BOREAS.—*Lat. Cuv: Règ. Anim.*—vol. iv., p. 94.
Lam: Hist. Nat. des Anim. sans Vert.—vol. v., p. 201.
Sab: Supp. to Parry's 1st Voyage—p. ccxxxv.
Ross, App. to Parry's 3d Voyage—p. 120; and *Polar Voy.*—p. 205.
CANCER BOREAS.—*Phipps's Voyage, Appendix*—p. 194, plate 11, fig. 1.
Zool. Dan.—vol. iv., p. 14, plate 32, fig. 1.

Several specimens of this very fine species of Crangon were obtained, by means of

a dredge, near Felix Harbour. It was also taken at a short distance from the west coast of Greenland, but seems to have entirely escaped the notice of Fabricius. We have in former voyages found it abundantly in various other parts of the Arctic Seas, but nowhere so numerously as near the Low Island (of Phipps), Spitzbergen, where it was first discovered. It has recently been brought from the shores of Kamtschatka and California, by Captain Beechey, as have also several hitherto undescribed species of Crustacea, but of which no account, it is much to be regretted, has yet been published.

2.—SABINEA SEPTEMCARINATA.

CHAR. GEN.—*Antennæ superiores* setis duabus in eâdem ferè lineâ horizontali insertis: interiore longiore. *Inferiores corporé breviores*, setaceæ, squamâ ad apicem externè unidentatâ pedunculo adnexâ: articulo primo ad squamæ medium non producto.

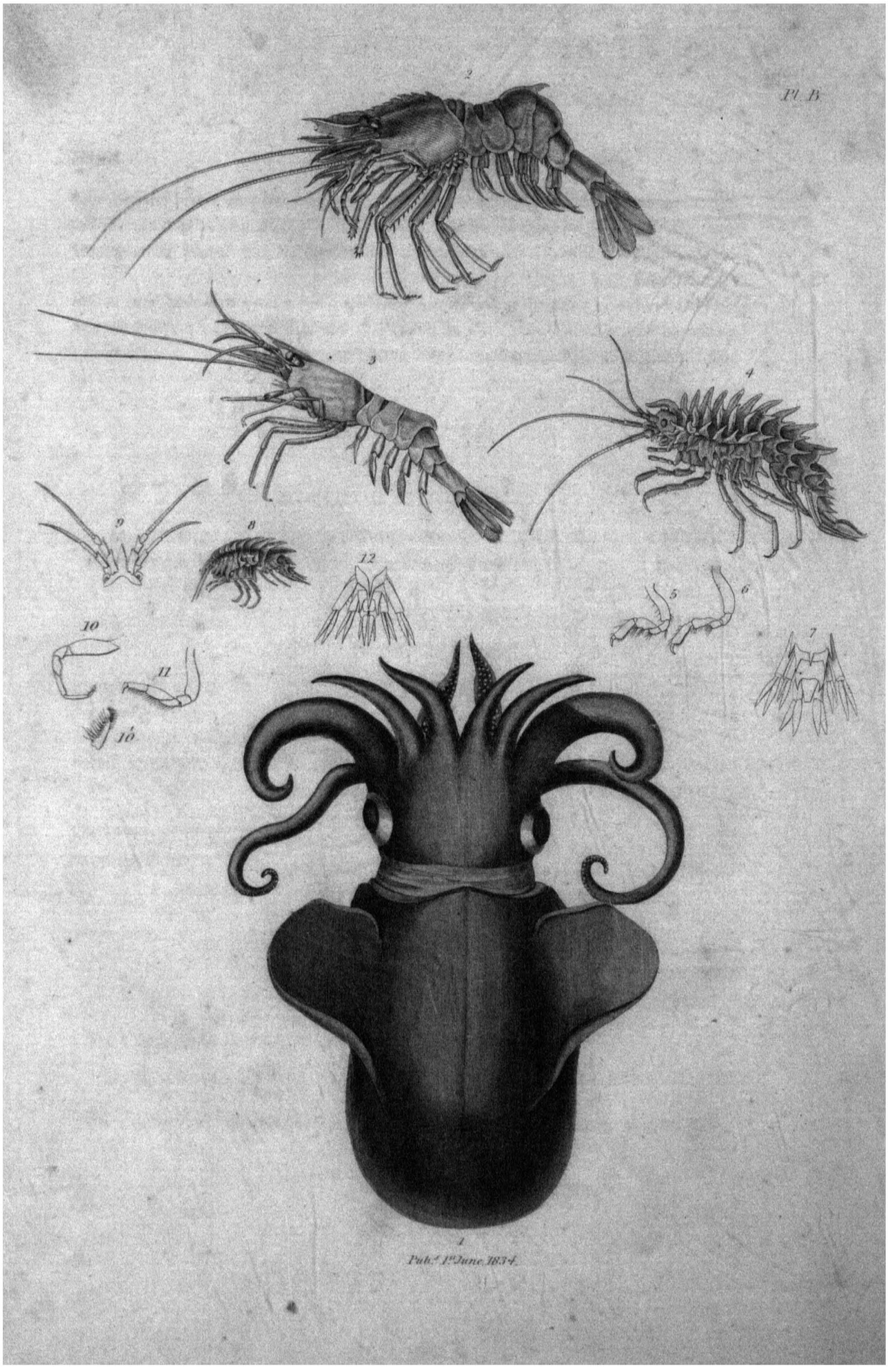
Palpi pediformes articulis quatuor exsertis; duobus ultimus longitudine æqualibus.

Pedes decem; par anticum majus compressum subdidactylum par secundum *brevissimum tenue inunguiculatum*, par tertium tenue præcedente longiore subcrassiore ungue simplici instructum; paria 4 et 5 præcedente crassiora unguibus compressis instructa.

CHAR. SP.—*Sabinea* thorace septemcarinato; carinis serratis.

CRANGON SEPTEMCARINATUS.—*Sab.: Supp. to Parry's 1st Voyage*—p. ccxxxvi., pl. 2, fig. 11—13.
Ross, App. to Parry's Polar Voyage—p. 205.

Owing to the peculiar formation of the second pair of legs, in this singular animal, it has become necessary to establish a new genus, of which it is the only known species; and I have much pleasure in dedicating it to my friend, Captain Edward Sabine, of the Royal Artillery, by whom it was discovered in the west coast of Davis's Straits, during Sir Edward Parry's first voyage to those regions. His very accurate description is as follows: "Length four inches; colour varied, red and white above, white beneath; thorax seven carinate, the three lateral carinæ on each side serrate, the middle one with strong spines; rostrum short, curving down between the eyes, grooved in the centre; the five upper carinæ carried on in very faint rudiments along the back; the terminal setæ of the superior antennæ inserted nearly in the same horizontal line, the interior one being the longest; the first joint of the inferior antennæ scarcely produced beyond the middle of the squama; a strong spine in the abdomen directed forward between the chelate legs; the last joint of the pediform palpi subacuminate,


Pl. B.
2
3
4
9
8
12
5
6
7
10
11
10
1
Pub.d 1.st June 1834.

rather longer than the preceding; second pair of legs slender, very short, bristled, and unarmed, in which last essential point it differs from the *Pontophilus spinosus* of Dr. Leach, *Mal. Pod. Brit.*, t. 37, to which in other respects this species bears a near resemblance."

It is more rarely met with in the Arctic Seas than the Crangon Boreas, but a few specimens were obtained near Felix Harbour. It was also found in a previous voyage near the island of Igloolik in considerable numbers.

3.—HIPPOLITE ACULEATA.

ALPHEUS ACULEATUS.—*Sab: Supp. to Parry's 1st Voyage*—p. ccxxxvii., pl. 2, figs. 9 & 10.
Ross, App. to Parry's 3d Voyage—p. 120; and *Polar Voyage*—p. 205.
CANCER ACULEATUS.—*Fab: Faun. Grænl.*—p. 239.

A. (H.) thoracis carinâ dentibus quatuor, margine antico trispinoso, segmentis utrinque aculeatis, palpis pediformibus apice spinulosis. (*Sabine.*)

The Alpheus Aculeatus and A. Polaris of Sabine, belong to the genus Hippolite of Leach (*Mal. Pod. Brit.*), on account of the second pair of claws being shorter than the first. This arrangement, which appears to be now universally agreed to by naturalists, is adopted by Latreille in the "Règne Animal," and is therefore followed in this notice. It is an abundant species in the Arctic Seas.

4.—HIPPOLITE SOWERBEI.

Plate B, fig. 2.

HIPPOLITE SOWERBEI.—*Leach, Mala. Pod. Brit.*—t. 39.
GAMMARUS SPINOSUS.—*Sowerby, Brit. Mis.*—vol. ii., pl. 21.

H. rostro alto obtuso supra multi-serrato, apice emarginato serrulato; subtus uni-serrato. (*Leach.*)

This species was first described by Mr. George Sowerby, in the "British Mis-

cellany," *loc. cit.* It was taken near the Scottish coast; and Dr. Leach received an imperfect specimen from the Firth of Forth, but it appears to be of very rare occurrence in those parts. During one of our former voyages, we found it near the island of Igloolik in considerable numbers, associated with the preceding and following species. Some specimens were obtained by us, through a hole in the ice, at Felix Harbour, in the very depth of winter.

The general form of the rostrum agrees with that figured by Dr. Leach, but many have it simply emarginate at the apex, and not serrulate.

It differs from the two following species in the dentations of the carina of the thorax, extending along its whole length; and in the upper part of the third segment of the body being produced posteriorly in a strong spine.

5.—HIPPOLITE BOREALIS. (*n. s.*)

Plate B, fig. 3.

Hipp. thoracis dimidio posteriore lævi, anteriore sub-carinato, margine anteriore utrinque bi-spinoso.

The principal differences, as compared with the A. (H.) Polaris of Sabine, consist in the absence of, or very slightly marked, dentations on the thoracic carina; in having only two spines, instead of three, on either side of the anterior margin of the thorax (that at the junction of the lateral margin being wanting in H. Polaris); in the superior antennæ being proportionally longer; and in being of a paler yellow colour, without the red spots and markings of the H. Polaris. As in the specimens of H. Polaris obtained by me, the middle lamella of the tail has from eight to ten minute spines along each side, and is terminated by several strong setæ, the margins of the rest of the plates of the tail are beautifully ciliated, excepting on the exterior edge of the lateral plates, which are toothed at their posterior angle.

Dr. Leach takes his specific characters from the rostral dentations, but these, as Captain Sabine justly remarks, in his description of *Alpheus* (*Hippolite*) *Polaris*, agree in no two specimens of that species, as to number, nor the rostrum as to shape.

H. Borealis was found associated with the preceding species, and was dredged up

from a depth of eighty fathoms off Elizabeth Harbour. It was also found in considerable numbers near the island of Igloolik on a preceding voyage.

6.—HIPPOLITE POLARIS.

ALPHEUS POLARIS.—*Sab: Supp. to Parry's 1st Voyage*—p. ccxxxviii., pl. 2, figs. 5—8.
Ross, App. to Parry's Polar Voyage—p. 206.

A. thoracis dimidio posteriore lævi, anteriore carinato serrato; chelis et unguibus apice nigris. (*Sabine.*)

The excellent description and plate referred to above, render any further remark unnecessary, except that the rostral dentations are usually more numerous, both above and beneath.

It is an abundant species in the Arctic Seas.

7.—MYSIS FLEXUOSUS.

MYSIS FLEXUOSUS.—*Lam: Hist. Nat. Anim. sans Vert.*—vol. v., p. 200.
CANCER FLEXUOSUS.—*Mulh: Zool. Dan.*—vol. ii., p. 34, pl. 66.
CANCER MULTIPES.—*Montagu, in Trans. Linn. Soc.*—vol. ix., tab. 5, fig. 3.
CANCER OCULATUS.—*Fab: Faun. Græn.*—p. 245, pl. 1, figs. A and B.
PRAUNUS FLEXUOSUS.—*Leach, in Edin. Encycl.*—vol. vii., p. 401.

Though but sparingly found in the seas of Europe, it inhabits some parts of the Arctic Ocean in amazing numbers, and constitutes the principal food of the prodigious shoals of salmon, that resort thither in the months of July and August, and upon which the inhabitants of Boothia depend, in a great measure, for their winter store of provisions. It is also the chief food of the whale, by which such a prodigious quantity of fat is produced in the body of that immense animal.

During the summer they assemble in vast myriads at the mouths of rivers, but in the winter are more generally distributed along the whole line of coast, and, together with

the Argonauta Arctica, are to be seen in every crack that opens with the tide, even at the coldest period of the year.

It is called by the natives Il-le-ak-kak.

AMPHIPODA.

8.—THEMISTO GAUDICHAUDII.

Th. corpore elongato, luteo; capite globoso; antennis inferioribus longioribus; pedibus inæqualibus, quinto pari longissimo; caudæ appendicibus planis, ciliatis. (*Guér.*)

This singular animal was first described by M. F. E. Guérin, in a paper entitled "Mémoire sur le Nouveau Genre Thémisto," &c., communicated to the Society of Natural History at Paris, August 29, 1828, and published soon after in the fourth volume of the memoirs of that society.

The specific name is in honour of Dr. Gaudichaud, one of the naturalists of the corvette *La Coquille*, during a voyage round the world, under the command of Captain Duperrey, by whom it was collected, together with a number of other curious specimens of marine invertebrate animals.

M. Guérin's minute and accurate description is exceedingly well illustrated by a lithographic delineation of the various parts that compose this singular and interesting genus. The individual selected for description was smaller than those met with by us during our late voyage to the Arctic Regions, our specimens being as large as M. Guérin's second or magnified figure; in every other particular they agree with his description, of which the following is an extract:

"Corps oblong, composé de douze segmens;* tête occupée entièrement par deux yeux à réseau, arrondie, non prolongée inférieurement en rostre. Quatre antennes, les supérieures plus courtes que la tête, courbées au bout; les inférieures beaucoup plus longues. Quatorze pieds; les quatre premiers courts, dirigés en avant, couchés sur la bouche, et représentant les deux dernières paires de pieds-machoires des crustacés supérieurs; les quatre suivans beaucoup plus grands, terminés par un crochet dirigé

* Not including the head.

vers la queue; la cinquième paire trés-longue dirigée vers la bouche, ayant l'avant-dernier article grêle, fort long, garni d'épines en dedans et terminé par un crochet; les quatre derniers, de moitié plus courts, dirigés et conformés de même, mais sans dents à l'avant-dernier article. Queue terminée par six appendices natatoires longs, aplatis, bifides à l'extremité; trois paires de filets également natatoires sous les trois premiers segmens de la queue."

It is most nearly allied to Hyperia of Latreille and Phrosina of Risso,* but differs from the former in the great length of the fifth pair of legs, and in the inferior antennæ being longer than the superior; and from Phrosina, in the greater length of the antennæ, and in the head not being prolonged inferiorly *en rostre*.

It is a singular circumstance in the history of this animal, that it has hitherto been found only in the vicinity of the Falkland Islands, and near the west coast of the peninsula of Boothia.

9.—GAMMARUS NUGAX.

GAMMARUS NUGAX.—*Sab: Supp. to Parry's 1st Voyage*—p. ccxxix.
TALITRUS NUGAX.—*Ross, App. to Parry's 3d Voyage*—p. 119; and *Polar Voyage*—p. 205.
CANCER NUGAX.—*App. to Phipps's Voyage*—p. 192, pl. 12, fig. 3.

By reason of the small superadded setæ on the upper antennæ of the Cancer Nugax (*Phipps*), I have referred it to the genus *Gammarus*, although it does not participate in all the characters assigned to that genus by Latreille. The lower antennæ being longer than the upper, it belongs to Lamarck's genus *Talitrus*. This last character, together with the second pair of feet, being elongate, and terminated by a flattened setose articulation, without a claw, render the establishment of a new genus necessary for its proper arrangement.

It is a very numerous inhabitant of the Arctic Seas.

* Cuvier Règne Animal—vol. iv., p. 117.

10.—GAMMARUS AMPULLA.

GAMMARUS AMPULLA.—*Sab: Supp. to Parry's 1st Voyage*—p. ccxxix.
Ross, App. to Parry's Polar Voyage—p. 204.
CANCER AMPULLA.—*Phipps's Voyage, Appendix*—p. 192, pl. 12, fig. 2.

In this species the superior antennæ, which have also the superadded seta, are one-half shorter than the inferior; the second pair of feet are unguiculate, not setose, but the work is very minute. The fifth and sixth pairs have femoral laminæ, but less than those of the seventh pair.

It is by no means abundant in the Arctic Seas, excepting near the Low Island (of Phipps), Spitzbergen, where it was first discovered. Some few specimens were obtained near Felix Harbour.

11.—GAMMARUS BOREUS.

GAMMARUS BOREUS.—*Sab: Supp. to Parry's 1st Voyage*—p. ccxxix.
Ross, App. to Parry's 3d Voyage—p. 119; and *Polar Voyage*—p.
SQUILLA PULEX.—*Degeer, Ins.*—vol. vii., p. 525, pl. 33, figs. 1 and 2.

G. caudæ dorso spinoso, oculis lunatis, pedibus quatuor anticis chelatis, pari septimo præcedentibus longiore. (*Sabine.*)

Is found abundantly along the shores of the north-east part of the American continent, and its contiguous islands, but especially so near the estuaries of rivers, seeming to prefer the brackish to the salt water of the ocean.

12.—GAMMARUS LORICATUS.

GAMMARUS LORICATUS.—*Sab: Supp. to Parry's 1st Voyage*—p. ccxxxi., pl. 1, fig. 7.
Ross, App. to Parry's 3d Voyage—p. 118; and *Polar Voyage*—p. 204.

G. rostro corniformi deflexo, dorso carinato, segmentis postice et acute productis. (*Sabine.*)

The specimens obtained in Prince Regent's Inlet agreed generally with Captain Sabine's description, but some few, taken at the same time, approached more nearly to Fabricius's* description of *Oniscus serratus;* the three posterior pairs of legs being much shorter than those of *G. loricatus,* but longer in proportion than those of *O. serratus,* when compared with the third and fourth pairs. In some specimens the rostrum was so very minute, as hardly to be distinguishable, whilst in others it was very large.

It is an abundant species.

13.—GAMMARUS SABINI.

GAMMARUS SABINI.—*Leach, Ross's Voyage*—oct. ed., vol. ii., p. 178.
Sab: Supp. to Parry's 1st Voyage—p. ccxxxii., pl. 1, figs. 8—11.
Ross, App. to Parry's 3d Voyage—p. 118; and *Polar Voyage*—p. 204.

G. segmentibus dorsalibus postice falcato productis, capite inter antennas acumine minuto.

This species was found abundantly in Prince Regent's Inlet, and near Felix Harbour.

Fauna Grœnlandica—p. 262.

14.—AMPHITHOE EDVARDSI.

TALITRUS EDVARDSI.—*Sab: Supp. to Parry's 1st Voyage*—p. ccxxxiii., pl. 2, figs. 1—4.
Ross, App. to Parry's 3d Voyage—p. 119; and *Polar Voyage*—p. 205.

T. (A.) rostro corniformi, antennis subæqualibus, corpore ovato depresso, caudâ compressâ tricarinatâ spinosâ.

The *Talitrus Edvardsi* of Sabine, belongs to the genus *Amphithoe* of Leach, which is adopted by Latreille. The excellent description and plate above referred to, render any further remark unnecessary.

It is an abundant species in the Arctic Seas, more especially near the island of Igloolik, where it was taken on a former voyage in very great numbers.

Nov. Gen.—ACANTHONOTUS. (*Owen, MS.*)

Char. Gen.—Antennæ subæquales, 4-articulatæ, articulo ultimo e plurimis segmentis efformato, articulo tertio superiarum brevissimo. Pedes 4-antici, monodactyli, filiformes, articulo ultimo primi paris serrato. Rostrum productum acutum, incurvatum. Oculi parvi.

15.—ACANTHONOTUS CRISTATUS.

Char. Sp.—A. segmentis 4-anticis in cristâ continuâ supernis elevatis; reliquis in spinis retrorsum inclinatis productis.

Acanthonotus cristatus, which forms the type of a new genus, closely allied to *Talitrus* of Latreille, was first discovered near the island of Igloolik, during Sir Edward Parry's second voyage; but as no account of the Marine Invertebrate Animals brought home on that occasion was published, it has hitherto escaped unnoticed. In the course of our late voyage a few specimens, both of this and the following new genus, were obtained at Felix Harbour.

To the generic and specific characters given above we may add, that all the segments of the body are produced inferiorly into long spines, that of the fourth being the broadest and longest; of the dorsal spines, the fifth and sixth are the longer.

The *femora* of the three last pairs of legs are produced posteriorly into long spines, and the penultimate segment has two spines.

The first and second joints of the superior antennæ are terminated above by a spine; the third joint is the shortest.

The toe of the first foot is serrate, having about eight teeth, and the claw is clothed with fine hairs on the exterior surface, as represented, highly magnified, in fig. 10′, plate B.

Plate B, fig. 8, represents a side view of *Acanthonotus cristatus* of the natural size.

Fig. 9, a magnified view of the upper part of the head and antennæ.

Figs. 10 and 11. Magnified view of the two first pairs of legs: and fig. 10′ shows the peculiar formation of the toe and claw of the first pair.

Fig. 12. Magnified view of the three posterior segments, and middle plate of the tail; together with the lateral and terminal styliform processes.

Nov. Gen.—ACANTHOSOMA. (*Owen, MS.*)

Char. Gen.—Antennæ inequales, superiores dimidio breviores, articulo ultimo e plurimis segmentis efformato, articulis tertiis et secundis superiorum æqualibus. Pedes 4-antici, monodactyli, filiformes, articulo ultimo primi paris unguiculato. Rostrum productum acutum undulatum. Oculi parvi.

16.—ACANTHOSOMA HYSTRIX.

Char. Spec.—A. segmentis 9-anticis spinis septem armatis.

This very distinct genus is more common at Felix Harbour than the preceding; it was taken at Igloolik on a former voyage in considerable numbers.

On each of the first nine segments of the body there are seven spines, forming in the aggregate seven longitudinal rows, protecting the back and sides of the body; in addition to these there are two spines above the eyes, one on each side of the rostrum;

this part is white, curved over the head, and directed forward; the eyes are small and white. The tenth segment of the body has only five spines; the fourth and fifth caudal segments having three, and the others only two spines.

The *femora* of the three posterior pairs of legs are each armed with two strong spines posteriorly, of which those on the last are the largest and strongest. The two posterior caudal segments are each furnished with a double styliform process, of which the anterior is the longer. The middle plate of the tail is truncate, with two styliform processes, similar to those of the preceding genus.

Plate B, fig. 4, represents a large-sized specimen of the *Acanthosoma Hystrix*.

Figs. 5 and 6, a magnified view of the two anterior pairs of legs.

Fig. 7, the three posterior segments and middle plate of the tail, together with the lateral and terminal styliform processes.

MOLLUSCA — CEPHALOPODA.

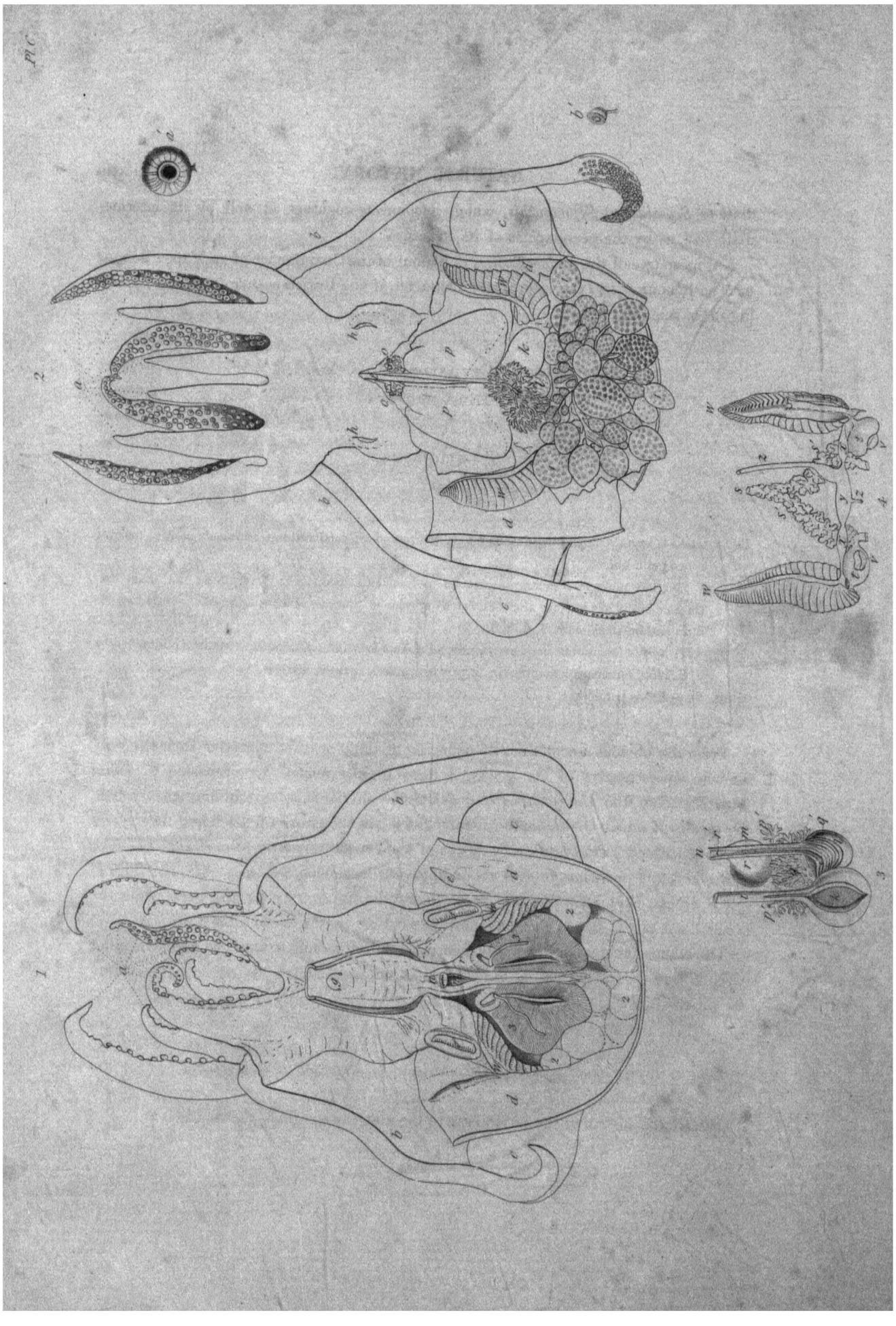
Nov. Gen.—ROSSIA. (*Owen.*)

A single specimen of a small species of Cephalopoda was taken near the beach at Elwin Bay, Prince Regent's Inlet, on the 29th of August, 1832. It was preserved in spirits, and brought to England; and I am indebted to the friendship of Mr. Owen, Assistant Conservator of the Museum of the Royal College of Surgeons, for the following account of this remarkable animal, accompanied with illustrations of his dissections, which have been engraved by Mr. I. Curtis, F.L.S., &c.

J. C. R.

"The small Cephalopod which you have brought from the Arctic Regions to this country, proves to be the type of a new genus. It differs from *Loligo* and *Sepioteuthis* in the form, proportions, and position of its lateral fins, and in the extent of its horny dorsal style, or *gladius*;* in these respects, it bears a closer affinity to *Sepiola* (Leach); it differs, however, from *Sepiola* generically in having the anterior margin of the mantle free in the whole of its circumference; its natural position is therefore interme-

* This is the term by which Aristotle designates the horny plate of the Loligines:—"Τῇ μὲν οὖν σηπίᾳ καὶ τῇ τευθίδι καὶ τῷ τευθῳ ἐντός ἐστι τὰ στερεὰ ἐν τῷ πρανεῖ τοῦ σώματος, ἃ καλοῦσι τὸ μὲν σηπιον, τὸ δὲ ξίφος. Sub dorso firma pars sepiæ lolligini ac lolio continetur; illius *sepium*, horum *gladium* vocant.—*Hist. Animal.*, lib. iv., c. 1. 12mo. Ed. Schneider.



diate to *Sepiola* and *Sepioteuthis*, which it connects together as well by its intermediate size, as by the peculiarities of its structure.

I propose to call the genus *Rossia*, in honour of the Commander of an Expedition, at once so honourable to the enterprising character of the British seaman, and so interesting in its scientific results.

Class—Cephalopoda. (*Cuvier.*)
Order—Dibranchiata.
Tribe—Decacera.
Family—Loliginidæ.
Genus—Rossia.

Char. Gen.—*Corpus* ventricosum; duabus pinnis latis rotundatis, subdorsalibus, antrorsum positis; margine antico pallii libero.

Brachia subbrevia, triedra; acetabulis pedunculatis, pedunculis brevissimis; ad basin brachiorum in duabus seriebus alternantibus, ad apicem in plurimis seriebus aggregatis. Ordo longitudinis parium brachiorum, 1, 2, 4, 3.

Tentacula longitudine corpus æquantia, ad apicem acetabulis pedunculatis minimis obsita.

Gladius, corneus, longitudine lin. ix. æquans; inferius parum dilatatus.

Char. Sp.—*Rossia palpebrosa.*

From the obvious uncertainty of deducing a stable specific character from the only known representative of its genus, I have limited myself to proposing a *nomen triviale*, taken from the remarkable development of the skin surrounding the eyeball, by means of which this animal evidently possesses the power of defending the eye, as the pulmonated Vertebrata do by means of their more regularly-formed eyelids. The utility of this provision, in seas abounding with fragments of ice, is obvious. Fig. 1, pl. B, from a sketch by Captain Ross, shows the appearance of the eyes while the animal was alive; fig. 2, pl. C, *h*. shows the closing of the eyelid after death.

The admeasurements of the specimen were as follow, but it must be borne in mind that it had shrunk in all its dimensions in consequence of having been macerated in spirit.

	Inches.	Lines.
Length from the end of the visceral sac to the end of the longest tentacle	5	0
Ditto from the end of the visceral sac to the anterior margin of the mantle	1	9

	Inches.	Lines.
Length from the end of the visceral sac to the interspace of the first or middle pair of dorsal brachia	3	2
Ditto of the tentacle	4	2
Breadth of the body (exclusive of the fins)	1	8
Ditto of the head, across the eyes	1	3

The specimen presented a dull dusky brown colour, over the whole of the dorsal and lateral aspects, and over the exterior of the arms. The pigment producing this hue was disposed in minute close-set points. Captain Ross's drawing of the recent animal exhibits a greenish metallic lustre, reflected from these surfaces, slight remains of which are still perceptible in the specimen. The ventral surface is of a light ash colour.

The form of the abdomen or visceral segment of the body is more ventricose than in *Sepiola*. The anterior margin of the mantle projects slightly forwards at the middle of its dorsal aspect, as in *Sepioteuthis*, and is reflected downwards for about half an inch before being continued upon the back part of the head. There is a transverse groove on either side of the mantle, about a line behind its anterior margin: this part is colourless anterior to the grooves, as in *Sepiola*.

The fins are short, semicircular, dorsal in their position, but nearer the sides of the body, and placed more forwards than in *Sepiola vulgaris*; the interspace between their origins is to the breadth of the body as 3 to 4, while in *Sepiola vulgaris* it is as 3 to 5. They project laterally from the body, with a slight inclination forwards. They measure in length one inch, in breadth ten lines.

The *brachia* are proportionately shorter and thicker than in *Sepiola*, more resembling those of *Sepia*, but not having the same relative dimensions as in that genus, e. g. the third, and not the fourth pair, is the longest (counting from the dorsal aspect), but the fourth pair is proportionately longer than in *Sepiola*. They measure,

The first pair, one inch.
The second pair, one inch three lines.
The third pair, one inch nine lines.
The fourth pair, one inch five lines.

They present the usual three-sided pyramidal form, with the internal facet beset with the suckers or acetabula. These are of a globular figure, supported by very short sub-lateral peduncles. Commencing from the base of the arms, the suckers are arranged in a double alternate series; this disposition prevails along the whole of the first pair, along

three-fourths of the second pair, and along about half of the third and fourth pairs of arms, beyond which the suckers are aggregated into irregular transverse rows of from three to five, diminishing in size to the apex of the arm. In this respect there is an intermediate structure between *Sepiola*, in which the suckers are in a double alternate series along the whole arm; and *Sepia*, in which they are aggregated from the commencement. The horny cup in each acetabulum has its margins entire: and its diameter is equal to one-third of the fleshy sphere in which it is implanted.

The tentacles or proboscides* are round, and slightly dilated at their extremities, which are beset for about nine lines by minute and close-set suckers; these diminish in size towards the extremity of the tentacle, and the largest of them do not exceed one-fiftieth of an inch in diameter. The horny cup of these acetabula is proportionately larger than in those of the brachia, and their pedicles are longer. (See *b*, pl. C.) A narrow membranous expansion is extended along the sides of the dilated extremities of the tentacle.

The tentacula emerge from within the membrane extended between the third and fourth pairs of brachia, but this interbrachial fold, though of greater breadth, does not connect the arms together for a greater extent than the membrane between the third and second, or that between the second and first pairs of legs; but there is no corresponding fold between the ventral pair of arms. In this respect *Rossia* resembles *Sepiola* and *Sepia;* in all of which, therefore, the interbrachial membranes have obviously other uses than to protect the tentacles, which can be retracted into a cavity below the base of the arms; they probably serve, but in a minor degree than in *Octopus*, as a retropulsive fin.

The eyes of the specimen were of large size, forming the usual convexity on each side of the head; they were, however, as has been before mentioned, almost completely hidden from view by the contraction of the lower eyelid principally, the opening of the fold corresponding to the transparent portion of the integument continued over the eyeball (for the animal cannot be said to possess a true cornea), was of a longitudinal figure, and dorsal in its position. In *Sepiola* there is a slight fold beneath the eye, corresponding to the largely developed eyelid in *Rossia*, but there is a greater proportionate breadth of the head at this part in *Sepiola*.

The siphon or funnel extends to within a line of the interbrachial membrane of the ventral pair of arms, resembling in this respect *Sepiola* rather than *Sepia*, or *Sepioteuthis*, where the funnel reaches only half-way between that part and the margin of

* This superadded pair of elongated arms were termed by Aristotle προβοσκίδαι, in contradistinction to the ordinary eight arms, which he calls πόδες.—*Hist. Animal.*, lib. iv., c. 1.

the mantle. It is depressed and tapers towards the extremity; within the tube, and two lines distant from the end, there is the small valve, which exists in all the Cephalopods that have locomotive organs adapted for propelling them forwards. On either side of the base of the funnel there is an oblong cartilaginous depression, surrounded by a raised margin, to which a corresponding projection on the inner side of the mantle is adapted. This structure for strengthening the attachment between the mantle and the head is met with in all the *Decacera*, and in *Ocythoë*, but does not exist in *Octopus*. The membranous expansions from the sides of the base of the funnel, corresponding to the '*callottes*' in *Octopus*, extend in *Rossia* around the anal aperture.

The rudimentary dorsal shell, or gladius, is not more than nine lines in length, and one line and a half in breadth at its lower and dilated half; there is a longitudinal mesial ridge on its external surface, and a corresponding groove with lateral ridges on the opposite side; it is of a firm texture, and brown colour anteriorly, but becomes thin, soft, white, and cartilaginous at its posterior extremity.

The digestive organs of *Rossia* resemble those of *Sepiola*, with the exception of the laminated pancreatic cæcum being of a simpler form, and the follicles appended to the biliary ducts being more developed; these are larger, indeed, than in any Cephalopod in which this structure has been found. The horny mandibles, and their surrounding fleshy lips, present no peculiarity worthy of remark. The outer lip, as in *Sepiola*, is more contracted than in *Sepia*. The œsophagus descends in the dorsal interspace of the hepatic lobes without dilating to form a crop. The muscular stomach is lined with a cuticle, but is not so strong as in *Octopus*. The laminated cæcum is a simple oval cavity, as in *Nautilus*, without spiral appendage. The biliary secretion enters it between two of the widest laminæ, which are continued onwards some way into the intestine. The gut ascends without any convolution on the opposite side of the liver, and terminates between the two muscles which connect the base of the funnel with the ventral side of the mantle, and which, from their disposition, serve as a sphincter to the intestine.

The lower pair of salivary glands are lobulated, and of the usual proportionate size. The liver is bilobed, each lobe notched at its upper end, and expanding towards the lower end. Besides the proper capsule, which has a smooth glistening surface, the liver is contained in a strong peritoneal cavity. The two biliary ducts emerge from the lower end and immediately branch out into a mass of larger and simpler follicles, which are arborescent, and extend their ramifications half an inch from the ducts, forming a mass, which conceals the upper halves of both the stomach and rudimentary pancreas. The ink-bag is situated between the liver and the muscles which surround the arms, close to which its duct enters the intestine. The ink is black, of the same tint as the china-ink.

The organs of circulation, in the form of the systemic ventricle and of the spongy *venæ cavæ*, resemble those of *Sepioteuthis* more than those of *Sepiola;* the branchial ventricles are proportionately larger than in any other Cephalopod. The *vena cava*, after its division, becomes dilated and cellular, but the cells are not produced outwardly into distinct pendulous follicles, the exterior of the vein presents simply a folded or convoluted appearance. The branchial ventricles are of a transversely oblong figure, four lines in length, and three in breadth: they have the small fleshy appendages, as in *Sepiola*, *Sepoteuthis*, and other true decapods. The fleshy stem of the branchia, through which the branchial artery passes is very broad. The branchial vein dilates into a sinus or auricle, before terminating in the systemic ventricle. This is of a cylindrical form, tapering at its lateral extremities where the blood enters, and bent upwards at the right side to give off the greater aorta; the lesser aorta comes off from the middle of the opposite side of the ventricle.

The larger aorta ascends with the œsophagus between the lobes of the liver, the smaller one descends to supply the ovary principally. The specimen was a female, and had been taken at the season of reproduction. The ovary occupied the lower half of the dorsal aspect of the abdomen; it was filled with numerous bodies, varying in size from one line to six in the transverse diameter, and with as various figures, some being spherical, others oval, some pyriform, and a few rendered angular by external pressure, but all having their superfices more or less reticulated, as in *Sepia*, &c., in consequence of the honeycombed glandular structure of their parietes. These bodies, which are appended by delicate peduncles, of various length, to one point of the membranous ovary, are commonly regarded as the ova,* but they are, in fact, the glandular calyces, which secrete the true ova; the analogous parts in the Nautilus I have termed *capsulæ oviferæ:* they correspond to the Graafian follicles or ovisacs of the Vertebrata. The ova in these ovisacs exhibited in *Rossia* various stages of development indicative of an internal impregnation: many of the reticulate ovisacs were collapsed, having discharged their ova; nine of the ova so discharged, were situated in the single oviduct. The ova which still remained within the capsules had the smooth transparent cortical membrane perfectly formed, and differed from the ova in the oviduct only in the tenuity of this membrane. The discharged ova measured five lines in the long and four in the short diameters. The oviduct was wide, thin, and membranous; it passed along the ventral aspect of the ovary and pericardium towards the left side: its termination was thickened, and beset with transverse glandular folds, as in *Nautilus*, and was situated immediately behind the two large superadded

* See Grant on the Anatomy of *Sepiola*, in Zool. Trans.—vol. i., p. 84, pl. 11, fig. 12.

glands. These bodies have been described in Sepiola,* as the oviducts, but they are equally distinct from the true efferent tube in that genus as in *Rossia;* the true oviduct being single in *Sepiola*, as in *Sepia*, and forming by its termination the crescentic glandular organ, which lies between and behind the two large accessory glands above mentioned; of which the function is to secrete the adhesive substance which connects the ova, after they have passed out of the oviduct, and before they are discharged by the funnel. Filamentary processes of the secretion were hanging from the ducts of the glands in the specimen here described. They are composed of numerous transverse laminæ, the secretion of which passes into a central longitudinal fissure, where it is moulded into the filamentary form. In *Nautilus* these glands are united at the mesial plane, and the corresponding organ is single in the pectinibranchiate mollusks.

EXPLANATION OF THE FIGURES.

Plate B.

Fig. 1. *Rossia palpebrosa*, from the dorsal aspect.

Plate C.

Fig. 1. *Rossia palpebrosa*, with the mantle and funnel laid open on the ventral aspect, showing the infundibular valve, the ova in the oviduct, and other viscera *in situ*.

Fig. 2. The same laid open on the dorsal aspect, and the capsule of the liver removed, showing the ovisacs, and the relative position of the viscera on this side of the abdomen.

Fig. 3. The digestive canal laid open.

Fig. 4. The branchiæ, and organs of circulation.

The same letters indicate the same parts in each figure:—*a*, the eight brachia; *a'*, one of the brachial suckers magnified; *b*, the two tentacula; *b'*, a tentacular sucker magnified; *c*, the fins; *d*, the inside of the mantle; *e e*, the processes which enter *f f*, the cavities at the base of the funnel; *g*, the infundibular valve; *h*, the opening of the eyelids; *i*, the œsophagus; *k*, the muscular stomach; *l*, the pancreas; *m*, the intestine; *n*, the anus; *o*, lower salivary glands; *p p*, liver; *p' p'*, hepatic ducts; *q*, hepatic follicles; *r*, ink-bag; *s*, vena cava; *s' s'*, its glandular auricular portions going to *t t*, the branchial ventricles; *v v*, their fleshy appendages; *w w*, the branchiæ:

* See Grant on the Anatomy of *Sepiola*, in Zool. Trans.—vol. i., p. 84, pl. 11, fig. 1.

x x, systemic sinuses; *y*, systemic ventricle; *z*, aortæ; 1 1, ovisacs in the ovary appended to filamentary pedicles; 2 2, ova in the oviduct; 3 3, glands which secrete the *nidamentum*, or connecting substance of the ova.

R. O."

PTEROPODA.

2.—CLIO BOREALIS.

CLIO BOREALIS.—*Cuv: Règ. Anim.*—vol. iii., p. 27. *Lamarck*—vol. vi., p. 286.
CLIO LIMACINA.—*Phipps, Ellis Zooph.*—p. 15, figs. 9 and 10.
Leach, Ross's Voyage—oct. edit., vol. ii. p. 172.
Sab: Supp. to Parry's 1st Voyage—p. ccxxxix.
Ross, App. to Parry's 3d Voy.—p. 120; and *Parry's Polar Voy.*—p. 206.
CLIO RETUSA.—*Fab: Faun. Grænl.*—p. 334.
CLIONE PAPILIONACEA.—*Pallas, Spicil. Zool.*—vol. x., p. 37, pl. 1, figs. 18 and 19.

Very numerous in most parts of the Arctic Ocean. Less abundant in Regent's Inlet and the Gulf of Boothia.

3.—LIMACINA ARCTICA.

LIMACINA ARCTICA.—*Cuv: Règ. Anim.*—vol. iii., p. 28.
Lamarck—vol. vi., p. 290.
Leach, Ross's Voyage—oct. edit., vol. ii., p. 172.
Sab: Supp. to Parry's 1st Voyage—p. ccxxxix.
Ross, App. to Parry's 3d Voyage—p. 120. *Parry's Polar Voyage*—p. 206.
ARGONAUTA ARCTICA.—*Fab: Faun. Grænl.*—p. 386.

A very abundant species; peopling as it were the Polar Seas, and constituting the chief source of subsistence to the Greenland whale. It is indeed most truly wonderful that so small and apparently insignificant an animal can be made to fulfil the most important purposes; from the smallest species of crustacea to the enormous whale, all derive their food directly or indirectly from this little creature. It is in fact

to the inhabitants of the Arctic Ocean, what the vegetable kingdom is to the inhabitants of the land—the foundation of animal existence.

ACEPHALA.

4.—BOLTENIA RENIFORMIS.

BOLTENIA RENIFORMIS.—*Mac Leay, Trans. Linn. Soc.*—vol. xiv., p. 536, pl. 16.
ASCIDIA GLOBIFERA.—*Sab: Supp. to Parry's 1st Voyage*—
ASCIDIA CLAVATA.—*Fab: Faun. Grænl.*—p. 303.

CHAR. SP.—B. obscura scabriuscula, corpore subreniformi, orificiis subprominentibus, pedunculo terminali. (*Mac Leay.*)

A single specimen of this extraordinary animal was dredged up from a depth of seventy fathoms, near Elizabeth Harbour. I can add nothing to Mr. Mac Leay's admirable description, except that the colour of the body is a very light brown, that of the pedicle darker.

5.—CYSTINGIA GRIFFITHSII.

CYSTINGIA GRIFFITHSII.—*Mac Leay, Trans. Linn. Soc.*—vol. xiv., p. 540, pl. 19.

ovata globosa cineracea glabra semipellucida, pedunculo vix longitudine corporis. (*Mac Leay.*)

This interesting species is of very rare occurrence, even in those seas where it was first discovered; a single specimen, taken in Fox's Channel, during Sir Edward Parry's third voyage to the Arctic Regions, fortunately for science came under the notice of Mr. Mac Leay, and, together with two other species of Ascidiæ from the same place, was the occasion of his learned memoir on the "Anatomy of the Natural Group of *Tunicata*," *loc. cit.*

Two specimens were obtained by us near Felix Harbour, but as these were abandoned with the rest of our collection, it is probable that the individual from which Mr. Mac Leay's description and drawings were taken, is the only specimen ever brought to England.

GEOLOGY.

BY CAPTAIN SIR JOHN ROSS, *C.B.*, *K.S.A.*, *K.C.S.*, &c.

GEOLOGICAL NOTICE RESPECTING THAT PART OF THE AMERICAN LAND VISITED DURING OUR VOYAGE.

I MAY commence with James's Island, of which Sir E. Parry examined the southern and eastern coasts; my observations which are peculiarly scanty for this part of our voyage, are limited to the northern shore, to which the name of North Devon has been given. I must at the same time say, that under my previous familiarity with the neighbouring and opposed shore of America, I formed the conclusions here drawn, more from a comparison of the physiognomy of the little known with that which had been far better studied, than from observations which our very brief intimacy with this coast afforded me no means of making.

My acquaintance with the shore in question begins at Cape York, and extends to Possession Bay. The whole of this line presented that succession of limestone, which from its similarity, in every particular, of picturesque forms, positions, and mineral characters, I had determined, when on the American shore, and with ample opportunities of examination, to be a "deposit" or "series," so resembling that which the geologists of England term mountain limestone, that it must be discriminated by this name, unless, as I do not yet know, the American philosophers have applied another term to their great calcareous formations.

Of the interior country on this shore, I must speak with more reserve; yet drawing such inferences as I here give, from the same source, namely, the exceeding similarity

of character in the forms of the land on the two sides of the passage which includes Barrow's Strait and Prince Regent's Inlet. It will immediately be seen, that on the American shore, the limestone skirts the bases of chains of hills which consist chiefly, or, to our observation at least, most conspicuously of granite, including some portions of the primary stratified rocks, which might have been more extensive than I had the means of ascertaining. Now, the same exact character of outline and general aspect pervaded the interior of James's Island, as far as that was visible; where a range of mountains possessing the same conical irregular forms as those on the American shore, rose at the back of the assignable limestone hills. I could not but conclude that their geological nature was the same; while some specimens of gneiss, of green compact felspar, and of granite, picked up on the beaches where our boats landed, served to confirm this conclusion: and the more so, from their absolute identity with the analogous rocks which I had collected along the shore from Fury Beach to the isthmus of Boothia.

If I have thus referred to my first and far more detailed observations on the geological structure of the American shore, I may commence at Cape Northeast, being the north-eastern part of America, sufficiently noted in the chart appended to this work.

At this place, the forms of the land alone might, to a practised eye, have disclosed the nature of the fundamental rocks; since the hills present those outlines, so well known, by which this limestone is characterized; the stratification equally indicating the mineral constitutions of the rock, in those cliffs and ravines, where it is peculiarly exposed; as the examination of specimens at more leisure, with the long continued contact which I could command throughout a space of many miles, could leave no doubt of the truth of these conclusions, from the point in question, as far as Fury Beach.

I must now observe, that from Northeast Cape onwards to Adelaide Bay, I could obtain no sight of any interior hills, of the same conical and irregular character as I had become so well acquainted with on the more southern parts of this shore. Every visible hill was flat-topped, so as to convince me that it was a part of the same calcareous range. But at the bottom of Cresswell Bay, I first began to see a range of interior hills, of a very different character: and subsequent observation, accompanied by a long experience of the nature of the rocks, which I could examine at hand, having taught me that the hills of this character consisted of primary rocks, and far most extensively, of granite, it is at this point that I must first note my assurance of the existence of a range of granitic and its associated rocks, on this coast; forming the fundamental structure of this country, and covered, or rather skirted, as is usual, by a range of the secondary, and, for the most part, calcareous series.

GEOLOGY.

As well as I could estimate, the distance of this primary interior range of mountains, from the sea-shore, judging at least by that of their summits, is about thirty miles. But from that, somewhat indeterminate point, of course, the ridge, if ridge it be, which appears so to the eye, inclines towards the sea line, and, in its progress thence, reaches the shore at Port Logan. The limestone which I have already mentioned, disappears in consequence, and I met with it no more on this eastern coast; recovering it only to the westward of the isthmus of Boothia, near Neitchillee.

I must now, therefore, note as much of its peculiarities as may enable geologists to form that judgment of its analogy to the rocks they have defined on which I have no right to decide, from my very imperfect acquaintance with this subject. I presume, of course, that they will call it "the mountain limestone," because this is the name which I have seen applied to rocks resembling it in character, and, as far as I understand those subjects, in position: but this however I must leave to the more competent.

From Northeast Cape to Adelaide Bay, it presents those forms which distinguish the limestone district of Yorkshire, but with far more decided shapes in some parts of this line, of which the analogies and resemblances may be seen in Derbyshire, though in the most remarkable places, these are very like to some scenery which I remember seeing in a French picturesque work, representing the scenery and antiquities of Pola, in Istria.

It would be to repeat what must be well known to every one interested in this subject, to say, that the fractures which the precipices of this rock present, are frequently such as to display the appearance of castles and towers, as the smaller ones are apt to exhibit the appearances of niches and statues, so as to confer on them a singular and striking variety of architectural effect, which, under peculiar circumstances, is even very deceptive. Of these apings of the works of art, we had an abundant and various display; that I could not make pictures of what I saw, from the extreme severity of the weather, and the difficult circumstances in which I was almost invariably placed, might possibly be regretted on the score of art, but can be of no moment for the present end, where the general fact and its bearings are so well understood by all whom geology can interest.

If this leading and striking character is not sufficient to satisfy geologists respecting the precise nature of this limestone, as it regards the systems of the earth which they have adopted, I suppose that this presumed character will be confirmed by its mineral nature, and by that of the organic remains which it contains. In different places, the former exhibits all those various characters, in texture and colour, which I have seen in collections of specimens of this particular limestone, as well as in several parts of Scot-

land, where this rock has been pointed out to me, though it would be superfluous for me to describe what is well known to every geologist. And if sometimes pure and somewhat marble-like in its texture, so it is argillaceous and dull, when it approaches to those shales into which it gradually passes, and with which it is interstratified.

It is in its shales also, as I understand is usual with all limestones, that the organic remains which it contains are chiefly found; though, as is not uncommon elsewhere, some of these occur only in that compact and almost pure calcareous rock, of which they form a part. If, even, I were better informed on this subject, so as to know the distinctions of rocks which are derivable from shells, I could not pretend to distinguish fragments, nor even the more perfect shells, by their present names in the modern systems; since I have had no means of keeping my knowledge up to the level of the improvements in this branch of science. Suffice it to say, that such organic remains, or shells, as I found, consisted of corals, of entrochi, of terebratulæ, and of others which I will not, or need not, pretend to name; as of all I may say, that they bore such a general resemblance to those of the "mountain limestone" of England and Scotland, which I have seen in collections, as will doubtless satisfy others respecting that in which I am not inclined to take any further concern than may be necessary for allowing others to form those conclusions, which it would be presumptuous in me to draw.

To terminate the history of this limestone, I need only remark in addition, that after ceasing at Port Logan, where the primary rocks reach the shore, it recurs at Neitchillee, to the southward of the isthmus of Boothia, and that it was thence traced for about two hundred miles to the westward, towards Cape Franklin, where our knowledge of this coast ends. On this long line, however, no mountains of this rock, such as I have described as occupying so great a range of country, occurred. In general, the shores were barely skirted by low strata of a calcareous stone, frequently schistose, intermixed with shales; as they were often so encumbered with fragments and blocks of the primary rocks, as well as of the limestone in question, that I could not often be sure that the fundamental strata were present. The geological conclusion that I was compelled to draw was, nevertheless, the same; namely, that the primary district of this portion of the American coast was skirted throughout its whole extent, with the exception of that line on which the sea met those rocks, by a series of secondary strata, of which this peculiar limestone was the leading and almost the exclusive member.

I ought now, according to the usual doctrines of geology, as I understand them, to have also found the red sandstone, which holds a place between this limestone and the primary srtata. I must, however, observe, that on the whole of the long line which I examined at various times, extending from Northeast Cape to the Western Sea, that

rock was never found in its position: whether owing to its real absence, or to the difficulty of seeing shores so often, and for such long periods, covered with ice and snow, or to my own negligence of this subject, where there was so much of more importance to engage my attention, I cannot now presume to say. Several fragments of a sandstone were however picked up on the shores, at various and distant places; as, for example, near Batty Bay, at Fury Beach, at Victoria Harbour and at other places which I need not name, proving the existence of sandstone strata in the vicinity, or at least somewhere on this coast.

But according to more practised judgments than my own, these specimens are inadequate to prove whether the rock whence they have been derived belongs to the lowest red sandstone, or to that which is termed red marl. That they are red, brown, and mottled, sometimes soft, and at others very hard, is all that I can say respecting them; and this diversity of character is, as I am informed, well known to occur in both the sandstones in question.

But there is one fact whence I am told I may conclude, that in some parts of this shore, at least, the collected specimens must have been derived from the red marl, whatever may be the case with respect to the southern part of the same line. This is the occurrence of gypsum in the vicinity of Northeast Cape: a mineral which geologists have hitherto referred to this series. But I must leave that matter to their judgments, as I have nothing more to suggest on the subject of these rocks, since I am not possessed of any other evidence than that which I have stated. It is only needful to add, that as I saw no strata superior to the limestone, and obtained no specimens likely to have been derived from any series higher than the red marl, as the several friends whom I have consulted admit; so I may, I presume, conclude that the secondary strata of this shore are limited to the rocks which I have described: a fact which, if I have read sufficiently on this subject, is exactly conformable to what occurs very widely in the northern portion of the North American continent.

Having already said of the primary land of this coast, that it forms ridges of hills more interior than those of limestone wherever these occur, I must now observe that it reaches the shore at Port Logan, and occupies the remainder of that coast to the southward, together with the valley of lakes that crosses the isthmus, as far as Lake Wittersted, where it is once more skirted by the flat limestone already described. Of the geography of this class of rocks, I can, of course, give no further description, since the climate and the snow united, prevented all research into the interior, and all minute examination, for the most part, of what was accessible.

To say that what I saw and could not touch, consisted of granite, is more than, as I am told, I ought to affirm, since geologists seem agreed that it is difficult to judge of

primary mountains by their physiognomy alone. Even when more near the eye, I will not say how often I may not have mistaken gneiss for granite; yet this latter rock seemed to me to predominate through all the ridges, as it was also that which I found far most frequently whenever I could obtain actual contact with the rocks.

That it presented the usual variety of external character, I need scarcely say, and that it included a great variety of mineral aspect or composition is what I can now but remember, without being able to describe. Only three varieties appear among the very few specimens which I brought home; namely, one of red felspar, white quartz, and hornblende, one of the same felspar and quartz, with white mica, and a third of pale felspar and quartz, with a dark variety of this mineral. In one place I noted that a large mass of this rock was thickly studded with garnets; but having brought home no specimens, I cannot now describe it more particularly.

Having found no specimens of gneiss in this small rescued collection, and having but little recollection of the places where I saw this rock, I can give no account of it. Commander Ross appears to have met with it more extensively than I did, but as this branch of natural history was not under his charge, I cannot derive from his recollection, any facts sufficiently positive to state, either respecting its geography or its mineral characters. I shall only note, that in Felix Harbour, I found hornblende schist, belonging to this series, as I am informed, together with that compact green felspar, which is known to be one of its inmates. That I saw common slate, or argillaceous schistus, in Victoria Harbour, and in one or two other places, is all that I can now recollect respecting that rock; while one of the engraved plates represents a part of a stratum associated with another of gneiss, traversed, as it appears, by a granite vein, and the whole intersected by one of quartz.

The last rock which I have to notice is trap. A considerable mass of this occurs at Saumarez River, and it is also represented in one of the plates; the only other place where I noticed it was near Elizabeth Harbour, where numerous veins traverse the granitic hills which skirt this shore.

Of mere minerals, I found agate pebbles in one place, with veins of white, pink, and yellow quartz, near Elizabeth Harbour, and copper ore near Agnew River and Lord Lindsay River.

The hills are often covered with granite boulders, offering the usual difficulty so often discussed: but I saw no other alluvia than those which are easily referred to the flowing of water during the summer thaws, and to the action of the waves on the shores.

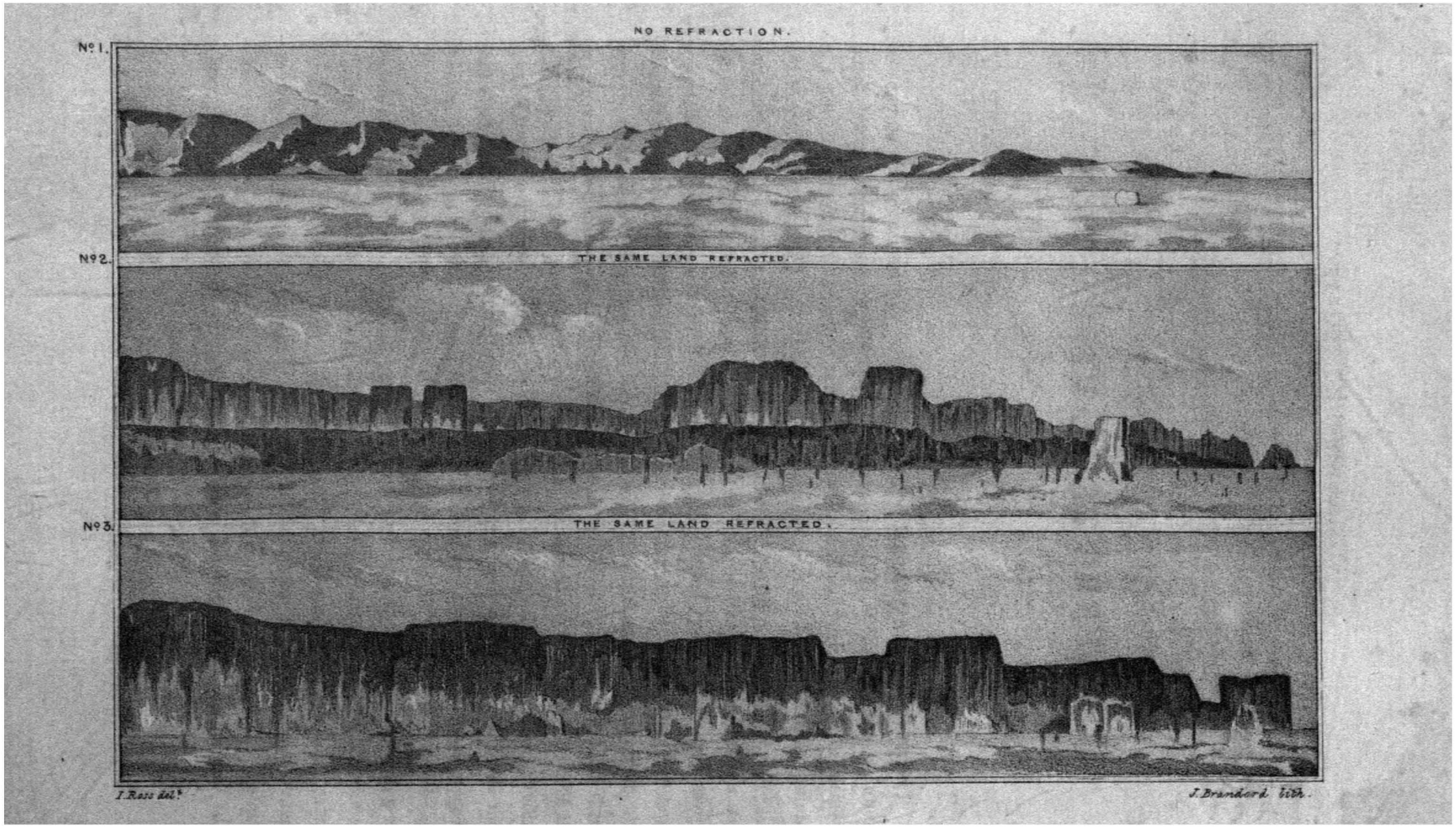
REPORT ON INSTRUMENTS.

My transit instrument was made by Mr. T. Jones, of Charing Cross, for my observatory at North-west Castle, Wigtonshire, where I had it in use four years. Its telescope was thirty-six inches in length, with an object-glass two inches and five-eighths aperture, and was an excellent instrument: it was the whole time under the charge of Commander Ross.

My theodolite was nine inches in diameter, with double telescope, and was made also by Jones, for the late Captain Bartholomew.

The diurnal variation instrument was made by Mr. Dollond, whose instructions I received respecting its use, and was the same which had been made for Sir John Franklin. I had also two altitude instruments made by Jones, which were supplied to me from the Colonial Office, and which I used to determine the height of the Eastern over the Western Sea. I had three dipping-needles, one made by Jones, which was with Sir Edward Parry; one by Pope, and one of my own construction. We had five sextants; an instrument sent by Mr. Warre, which was the invention of Lieut. Drummond, R.A., being a compass with apparatus for finding the latitude and longitude attached to it, and was a very ingenious invention; but, as the compass had ceased to traverse where we wintered, it could not be tried. My telescope for occultations was sixty-six inches focal length, with an aperture of three inches and five-eighths; the object-glass by Tully. I had also Barlow's apparatus, and Gilbert's azimuth compass, and six others; two marine and one mountain barometer. Rowland's and Tyrrel's perspective instruments, the former was found of great value as

the greatest tyro in drawing could not fail to delineate the land correctly with it. The deep sea clamms, Dr. Marcet's water-bottle, Massey's patent log, and other instruments of minor importance, were, with the exception of Jones's dipping-needle, two sextants, and two spyglasses, left at Victoria harbour, where they were buried on the north side of the bay; but I have no doubt but they would be discovered and destroyed by the natives.


NO REFRACTION.
Nº 1.
Nº 2.
THE SAME LAND REFRACTED.
Nº 3.
THE SAME LAND REFRACTED.
J. Ross del.
J. Brandard lith.

TERRESTRIAL REFRACTION.

THOSE who pass a year northward of the Arctic Circle, during the spring and autumn, are amazed at the extraordinary appearance of the objects around them, which are often changed in shape so totally different from what they really are, that it is quite impossible to take correct sketches, or make any thing like a true estimate of the distance of the land, which, in the course of a few minutes, is often so much changed as not to have any thing like the natural or true outline. Captain Scoresby gives some extraordinary instances of both land and ships seen at an immense distance, and on our first voyage it is recorded, that Cape Clarence was seen from the deck at the distance of one hundred and twenty miles, the ship being at that time two degrees of latitude south of the cape; and, indeed, it was only in the spring after our arrival at Felix harbour, that we discovered the land to the east-south-east of us, with many intervening islands. But the most remarkable circumstance which occurred during our observations was the uneven current of refraction raising an intermediate body (an iceberg or island) above the more distant land, which at the time of no refraction was considerably higher. This fact at once shows the fallacy of setting up a mark or board at a distance of a few miles to observe a star setting behind it; and which could be no proof of the inaccuracy of the table of refractions in the Nautical Almanac, which, indeed, I found by all my observations to be wonderfully correct. I cannot omit to mention an extraordinary instance of unusual refraction, which took place on the 22d of September, 1832, when we were at North End Cape, lat. 73° 53′ north, long. 90° west. The weather was very clear, and, in an east-north-east bearing, no land could be seen.

TERRESTRIAL REFRACTION.

I was watching the rising of the sun, with my eyes fixed to the spot, when I saw the sun emerge; in an instant his lower limb was his full diameter above the horizon, without his figure being changed; in this position he remained about half a minute, then fell, his lower limb being dipped about one-eighth of the diameter; he then assumed various amorphous forms, continued varying for five minutes, and at length assumed the proper form.

The plate is given to show the land in three different states:

First, as with no refraction, distant fourteen miles.

The second is the same land, with an iceberg four miles distant raised above the land.

The third, the same refracted in a different way on the same day.

These outlines are taken by Ronald's invaluable instruments which I had fixed on a point of land sixteen feet above the level of the sea, and by which the figure could be traced with the greatest precision, and with which I made above three hundred observations, tending to confirm what I have stated. These observations were taken during the first week in May, 1831.

ANALYSIS OF FLUIDS, &c.

I AM indebted for the following article to my friend Mr. Thomas Rymer Jones, who, in conjunction with Mr. Hemmings, submitted the articles I gave them to a careful examination, and made the following report, which requires no comment, as the acquirements of these gentlemen are known to qualify them highly for such an investigation.

1.—SEA-WATER FROM PADLIAK OR SPENCE BAY.

This water was taken from the sea by me on the 4th of June, 1830, and carefully preserved in a bottle with a ground glass stopper, and was never out of my possession, having been carried by me the whole length of our fatiguing journey to Fury beach: in order to establish the specific gravity and component parts of the water in the sea of King William, or that to the westward of the isthmus of Boothia.

The specific gravity of this water was 1.011 at a temperature of sixty-four degrees of Fahrenheit, and a wine pint contains 116,97 grains, of which matter—viz.:

	GRAINS.	
Magnesia . .	5.81	
Chloride of sodium	92.5	
Sulphate of lime .	7.67	
Sulphuric acid .	4.39	—besides that contained in the sulphate of lime.
Muriatic acid .	5.65	—besides that contained in the muriate of soda.

The salts therefore contained in the water are most probably—

	GRAINS.
Muriate of magnesia	8.7
Sulphate of magnesia	8.26
Chloride of sodium (dry salt)	9.25
Sulphate of lime	7.47
	116.93

2.—BRINE FROM FURY BEACH.

Having found this fluid in a beef-cask at Fury beach on our return to winter there, and still in a fluid state while the temperature was below zero, I made use of it as an artificial horizon; and as it was subsequently exposed to a temperature of forty degrees below zero (at which point the finest mercury freezes) without being frozen, I thought it worth while to preserve some for analysis, and the following is Mr. Jones's report:

The specific gravity of this brine was 1.171 at a temperature of sixty-four degrees of Fahrenheit. Two fluid drachms contained thirty-one grains and a quarter of solid matter, of which twenty-eight grains were pure chloride of sodium, the remainder contained traces of sulphates of magnesia and lime, and a small quantity of animal matter; a portion placed in a thin glass tube was submitted in succession to the action of some of the most powerful freezing mixtures without undergoing congelation.

3.—WATER FROM THE RIVER SAUMAREZ.

This river, which is in the latitude of seventy degrees north, was found flowing and unfrozen by us early in May, 1830, and, according to the account of the natives, never freezes. As the cause of this phenomenon was unexplained, and might be attributed to the nature of the water, I took some carefully out of the river and found its temperature then at thirty-three degrees of Fahrenheit; since which it was, like that of the western sea, never out of my possession, but kept in a bottle with a ground glass stopper, and carried by me from the time the Victory was abandoned until our return, when it was handed to Mr. Jones, and the following is his report:

Specific gravity of the water from this river is 1.004 at sixty-four degrees of Fahrenheit. This was found to contain a minute portion of the chloride of sodium, and traces of the sulphate of lime.

From this it must appear that the nature or component parts of the water could not be the reason that it did not freeze, and it must therefore be attributed to springs in the bottom of the Great Lake, out of which it flows, and which we estimated to be about three hundred feet above the level of the sea. This chain of lakes was about fifteen miles long, and in some places, three miles wide.

4.—WINE FROM FURY BEACH.

This wine had been lying four years in cask on the beach before we arrived, when we took it on board, and bottled it, after which it was four years in my possession.

Sherry—specific gravity 0.991 at temperature 64 degrees of Fahrenheit.
Port wine—ditto ditto 0.981 ditto ditto.

5.—RUM FROM FURY BEACH.

This is under the same circumstances as the last.

Specific gravity . . 0.910.

These articles had undergone no change, except, probably, a diminution of strength sufficiently indicated by the specific gravity. The same may be also said of a bottle of brandy cherries which were brought home, *without being opened*, the fruit not having been in the least decomposed. In addition to this, I may mention a bottle of the cordial called "Parfaite Amour," which, although exposed to the severest test, had lost neither colour nor flavour.

6.—LEMON JUICE.

This had been exposed in casks for eight years in Fury beach, and we were of opinion that it had lost much of its antiscorbutic qualities, from its want of the expected effect on those who were afflicted with scurvy; and our opinions seem to have been well founded, according to the following report:

The lemon juice has undergone a partial decomposition, but still contains a considerable

proportion of citric acid; the decomposition being principally in the *vegetable* matter, seems to imply that citric acid alone is not a check to that dreadful malady the scurvy.

7.—THE MUSTARD

Had, as might be expected, lost the greater part of its pungency.

STATE OF PROVISIONS.

The provisions of which the following account is given, had been lying exposed to the climate for eight years, in the latitude of seventy-three degrees and forty-seven minutes north, and longitude of ninety-one degrees and forty-seven minutes west, and very little above high-water mark.

The preserved meats, with few exceptions, were the manufacture of Messrs. Gamble and Co., and being enclosed in tin cases, could not be discovered by animals who depend on the sense of smelling: these were cylinders of various sizes, the ends of each becoming concave or convex, according to the degrees of contraction or expansion caused by the climate, secured them against bursting from its effects, and the contents were found to be in nearly the original state: these consisted of beef, roasted and boiled, veal, mutton, spiced meat of various kinds, turnips, parsnips, and carrots, all of which were found to be in excellent preservation. The soups, which were preserved in quantities, from a quart to a gallon, were excellent, and we left a considerable quantity behind, but no meat of any kind.

The flour, which was preserved in iron-bound casks, and had been likewise exposed for eight years to the climate, was found to be in good condition; for although in many cases the hoops had slackened, so as to admit the moisture into the cask, it penetrated but a short way, while the whole of the interior was perfectly sound. The bread, of which there were many casks, was in a good or bad state, according to the soundness of the cask which contained it, and we employed ourselves in separating the bad from the good, and put all into repaired casks. A part of this, and also of the flour, is sufficient, with the addition of the remaining soup, to sustain the life of twelve men for a year. Owing to the pickles being also in cask, they had suffered much, the vinegar having leaked out of most of them: fifty of these, and twenty-five of lemon juice, are also left, at a little distance south of the house, and covered with coals, as the most effectual way of preserving both.

PHILOSOPHICAL OBSERVATIONS.

ON COLD.

HAVING already devoted much in Chapter XIII. of the Narrative on this subject, as it regards the human body, it only remains to publish my experiments on its effect on other substances. I shall begin with those on ice, which were repeated yearly: the thickness of the ice was measured regularly, both on a lake and in the sea, every month, and was found to increase until the end of May, when it had arrived at its maximum thickness, which in the sea was ten feet, and the lake eleven; the proportion being so much more on fresh than on salt water. In the months of February and March, when the temperature of the air was at fifty degrees below zero, the temperature of the ice gradually diminished between the surface and the water, which was, immediately below the ice, at the temperature of twenty-seven degrees; showing that to freeze sea-water below the ice (where no air was to be found) required a temperature five degrees lower than the freezing point of Fahrenheit. This was done by excavating a large shaft in the ice, and, as it deepened, a horizontal hole was bored large enough to admit the thermometer at every foot in depth, until we arrived at the water, in which a thermometer was immediately immersed, and the result obtained, the further detail of which need not be presented.

ITS EFFECTS ON SNOW.

The same experiments were made on snow, with proportional results; twelve feet depth of snow being equal in the resistance of cold to seven feet of ice. It was from these experiments that I determined on covering our miserable canvas habitation at Fury beach with ice, which was accomplished by watering the snow walls as they were constructed, and also the roof; the former being made from seven to nine feet thick, and the latter from four to six. This we found effectual against cold until the mercury had

frozen; after which, the frost penetrated more or less according to the force of the wind. The general effects of the cold on the snow as it fell, was to pulverize it, so that when a strong breeze came it rose and filled the air like dust, to a considerable height. On the other hand, the valleys, and every place into which the wind had forced the snow, became so hard as to bear being formed into blocks, like Ashlar work, of large dimensions, and rolled into the sledges without damage, and thus we were enabled to build the walls of our huts with considerable rapidity, our first care on halting being to find a place where the snow was hard.

ITS EFFECTS ON MERCURY.

The effect of cold on mercury depended materially on its purity, and I observed that the longer or the oftener it was used, it froze the sooner. It was at first imagined that the lead of the trough which is generally used in artificial horizons, amalgamated with the mercury, but I always used a wooden trough, and a glass bottle to keep it in; notwithstanding which the scum, which was always greatest in cold weather, was equally large, and every year the mercury which had been used, froze at a higher temperature, until it reached to thirty-one degrees, being eight degrees higher than the usual point; while mercury, which had not been exposed, retained its purity. We went through the usual experiments of freezing it in a pistol-bullet mould, and firing the ball through an inch board; as also the finest almond oil, which froze at fifteen degrees, and became very hard at thirty degrees, so as to penetrate, when formed into a bullet, through an inch plank at the distance of five yards.

The effect of cold on various metals was found to be the same as has been often published; but perhaps the loss of magnetic power, in no less than twelve needles of compass cards, which were found on Fury beach, may be most properly attributed to cold, as they were found with the needle pointing north, south, east, and west, and all alike deprived of their magnetic property. The effects of cold on the icebergs was the most striking; as soon after the thermometer had sunk below zero, icebergs were heard renting and tumbling to pieces with tremendous noise; and in the spring, these immense masses were seen, like as many mountains after the devastation of an earthquake. It has been supposed that the cold also had the effect of giving the green and blue colour to the ice; but, although these colours were deeper and more general after than before winter, still I do not think the fact to be sufficiently proved, that the cold is the only cause.

SURGEON'S REPORT.

REPORT

DR. GEORGE M'DIARMID, SURGEON OF THE VICTORY,

ON THE SICK OF THE CREW.

THE following interesting Report of the Sick on board the Victory, was intended for the Narrative; but Dr. M'Diarmid, to whom I am now indebted for it, was unexpectedly appointed to a vessel which was ordered suddenly to India, and sailed before he could prepare it for publication; and he has only returned in time for its insertion in the Appendix. The Report may appear short, as that of so great a length of time, but it is Dr. M'Diarmid's intention to give to the public a fuller account than the prescribed limits of this Appendix could admit of. It has always given me great pleasure to do justice to his uniform zeal and attention, both as regards his profession and other duties; and it has also afforded me much gratification that his conduct has been duly appreciated by the Lords of the Admiralty, who, having dispensed with the usual term of servitude in the Royal Navy, promoted him to the rank, successively, of Assistant-Surgeon and full Surgeon in his Majesty's naval service soon after his return.

JOHN ROSS.

SURGEON'S REPORT.

July 13, 1829.—Our armourer was on this day attacked with pulmonary inflammation; he had, as we subsequently learned, previously suffered from the same malady, and had not been long discharged from one of the London hospitals, when he proffered his services in this expedition. It had been Sir John Ross's intention, soon after the commencement of the voyage, to send him home in one of the whale ships, I having already reported my patient as unfit for further service, but no opportunity presented itself for his return. The poor fellow's case terminated in confirmed consumption, and, although his death was probably in some degree accelerated by the severity of the climate, I think that most likely his disease would have terminated fatally had he remained in England; and I question whether, had he been at home, he could have received more attention, or met with more kindness, even from his relatives, than he experienced at the hands of his shipmates. One wish of his only remained ungratified—he dreaded having his remains deposited in a foreign land, and often expressed vain regrets, that he could not return home to expire on his native soil.

July 27, 1829.—On this day, John Wood, seaman, aged twenty-two, a healthy and robust young man, fractured both the bones of his left leg in jumping into the launch. The cure was completed within two months by ordinary means, nature effecting the union, and the doctor getting the credit of it.

This man was, nine months after his recovery from this accident, severely afflicted with sea-scurvy, and likewise, subsequently in 1833; and as it has been observed, especially by the medical officers attached to Anson's expedition in his Voyage round

the World, that fractures become disunited under the ravages of this malady, I think it proper to observe, that in this instance nothing of the kind occurred, although scorbutic symptoms made their appearance so soon after the fractured bones had become consolidated. The symptoms of his first attack, in 1830, were soon controlled; in 1833, however, the disease assumed a more malignant and violent character, and rapidly attained its worst and most deplorable form: the gums were absorbed almost to the edge of the sockets of the teeth, and had become black and putrid, livid patches appeared on the limbs, the legs became œdematous, and the powers of life were prostrated even to repeated faintings. This melancholy state was rendered still more distressing from the bad quality of the lime juice which we had obtained from the stores of the Fury, and which having become decomposed by time, was almost inefficient; yet, in spite of the severity of the disease, and its protracted continuance during a period of four months, I never discovered any indications of disunion in the broken limb. It may, however, be observed, that Lord Anson's men were destitute of all kinds of fresh provisions, and, therefore, not only could not cure, but were unable even to mitigate the progress of the horrible malady which raged among them.

July 24, 1831.—Anthony Buck, aged twenty-four. As this man's case, blindness after epilepsy, is referred to in the Report of the Committee of the House of Commons, it may be, perhaps, interesting to give a short outline of it. In May of this year, he had suffered from snow blindness, which had probably left a disposition to cerebral disease. On the day above mentioned, when on a fishing party seventeen miles from the ship, he had his first attack of epilepsy, from which he recovered with impaired vision of the left eye. On the eleventh of October, he had a second attack still more violent, causing nearly total blindness of both eyes. The fits recurred at irregular intervals for two months, and eventually disappeared, leaving him, however, nearly blind. It cannot be of much interest to trace the various remedies used in this case; but it may be reasonably hoped that the sight may be eventually though gradually recovered; since it is most probable that the blindness depends only on a loss of nervous energy in the retina, from the violence of the fits, a degree of impaired vision being a common consequence of such cases.

Since writing the above, I have been told that Buck has partially recovered his sight. Such cases are sometimes fairly referred to organic lesion, but are more usually functional diseases simply.

The second fatal case under my care was one of dropsy (ascites). James Dickson had been on a fishing party two months before the manifestation of dropsical symptoms. He had fallen into the water, and had slept through the night in his wet clothes. His general health from this period was gradually disturbed, and I attribute his malady to the suppressed perspiration consequent upon exposure to damp and cold. On the 20th of October, 1831, he complained of pain and tightness of the abdomen, which, on examination, was found to be swollen and tense. Aperients and diuretics were ordered, as also mercurials to promote the action of the absorbent system, due attention being paid to the function of the skin. I combated the accumulation of fluid with varying success, until the latter end of December, when the tension became extreme, and he was tapped. The operation, as usual, gave him only temporary relief; and, gradually sinking, he died on the 10th of January, 1832.

It is worth while to notice, that at various times during the course of this complaint, symptoms of scurvy made their appearance. So again in Buck's case (epilepsy) the same disease occasionally manifested itself; again in Henry Eyre's case (the cook), who was affected with rheumatism; and in short, in nearly all the cases, the same scorbutic symptoms were mixed up with the proper characteristics of each disease. Even consumption, absolute as it is in our climate, was modified by the same controlling diathesis. The experienced statistical investigator will, in the history of all atmospheric constitutions, observe the same phenomenon in all parts of the world. The cholera epidemic, which stalked like a malignant giant over a great part of the globe, spreading death and desolation in its course, asserted the same controlling influence over disease in general, as has been remarked by most writers on that disease. So again in districts where ague prevails, most diseases receive some additional intermittent character which in other regions do not properly belong to them.

From the experience of former voyagers, and from a consideration of the common causes of scurvy in a northern region, we had sufficiently been taught, that no precaution, however strict, no policy, however comprehensive, could ensure a crew from the occasional ravages of this debilitating malady. The absurdity of attributing it to the single cause of salt provisions, would have been inferior to the pathological views even of the earliest investigators of disease; for the ancients tell us, that not any one cause produces disease, but that is assumed in common parlance as the cause which seems chiefly to have contributed to the effect. Every depressing agent contributes to establish

the scorbutic condition. No wonder, then, that at one period a vexatious confinement with no probable limits, and the most harassing disappointments, hope almost chased away by despair, provisions at times scanty, and a deficiency of all comfortable clothing, should have rendered the constitutions of a great part of our little crew obnoxious to this northern enemy. There were times when the spirits of the crew, like our thermometers, were below zero; and such a condition, conjointly with the causes above mentioned, not only introduced some severe cases, but likewise in a degree baffled our efforts at a cure. The means of prevention were rigidly enforced, and the importance of exercise, by walking, and occasionally dancing, was never lost sight of. Humidity was carefully watched as a known enemy; and to the various ingenious contrivances of former expeditions, an original and successful invention for condensing vapour was superadded. Regular nutritious diet, and plenty of it, should be the rule in serving out the provisions for a northern expedition: we may be disposed to express disgust at witnessing an Esquimaux meal, and indeed nothing can well be more revolting to an European of even ordinary refinement; but let us recollect that the common dietetic rule in the days of Augustan polity was "semper quamplurimum assumere dummodo hunc concoquat," and we must leave the savage on a par with the Roman courtier, since they have equally the same limit to the work of refection—the utter impossibility of eating more. Let it be distinctly understood, that I am not advocating gluttony, but merely recording what I believe to be a fact, that very liberal feeding is indispensable to a due generation and preservation of heat in such a climate, and therefore indispensable to the prevention of scurvy.

Seventeen of our crew, in all, were more or less sufferers from this complaint: one only fell a victim to it. So long as we had a store of good lime-juice, good clothing, generous diet, and a favourable condition of cheerfulness, it was not difficult to arrest or control the slighter cases which appeared; but when, in the winter of 1832, and spring of 1833, after deserting the ship, the men had to contend with depression of mind, and a scanty diet (a diet which would have suited a Pythagorean better than a sailor, for we had scarcely any animal food, while our clothing had become almost unserviceable), the development of severe scurvy at once served to heighten our misery, and to show how poor a defence a vegetable regimen (chiefly farinaceous) is, when the causes above named are conjointly exerting their depressing influence.

Here again I may note, that those who were slightly affected at the time they left the ship, were so far benefited by the daily exercise of walking from Victoria harbour to Fury beach, a distance of between two and three hundred miles, that on their arrival at the latter place every man had undergone a spontaneous cure. But it was during our stay at the Fury's stores that the worst form of the disease appeared.

Mr. Chimham Thomas was one of those who had been scorbutic on leaving the ship, and also at various times for two years before. Like several others, he had experienced a spontaneous cure during the journey to the stores, and from July, 1832, to November of the same year, had remained free from the disease; but, under the causes above referred to, his symptoms claimed my notice. On the 12th of November, he was so seriously ill, that with a paucity of all means of controlling the disease, I from the first had apprehensions of the result. There was, indeed, lime-juice found among the Fury's provisions, but seven years had sufficed to render it inert. Neither had I much to expect from exercise; for although it were easy from the commencement to place a sentinel over such a patient on board a man-of-war, admonition was all that in our situation could be had recourse to. We had indeed plenty of good flour, carrots, parsnips, vegetable soup, peas, &c.; but it was impossible to get the men to persist in such food, neither, under the complication of such depressing causes, can it be relied on with any certainty as an antidote. After struggling with the usual appalling symptoms for three months, debilitated by recurrent hæmorrhage from the nose, and his life prolonged by friction, and such excitants as our limited means allowed, a miserable death closed an existence still more miserable. Another case, previously recited (John Wood), promised to be equally severe; but, as it did not occur until March of 1833, he had all the benefit of the warm season, and of a change of diet, which our shooting parties afforded us in the summer months, so that by July he was out of danger.

The other fifteen cases were of various extent, and all did well: and I may here notice, that in all, a disposition to constipation rather than to diarrhœa characterised the disease. It might be supposed that, as scurvy is as familiar to the natives as the snow by which they are surrounded, some new remedy, either external or internal, might have been learned from them. With the direct causes of the complaint they were as conversant as the most learned of us: they say it follows a want of provisions,

and they know well that good living and active exercise are indispensable to the cure. Their sole internal medicine is train oil. This is, in fact, their panacea; and, if it fail, the conjurer is their only refuge.

All northern expeditions have furnished cases of frostbite, or, as we call the milder affections in our own temperate region, chilblains, for they differ only in degree. With due care, these accidents ought not to occur, but to be at all times on our guard is almost impossible. Security is mortals' chiefest enemy, and a long immunity from suffering renders us negligent of danger. In all, we had about a dozen cases. That of George Taylor, one of the mates, demands distinct observation. This poor fellow had gone out with a travelling party, and was at the time about forty miles from the ship. In the morning, he had put on a wet stocking; when on his journey, he felt his foot cold and benumbed, but imprudently persisted in walking without noticing it. In the evening, when ordered by Captain James Ross to put on the usual night-stockings, he discovered that the whole of his foot was frostbitten up to above the ankle. I did not see the case till his return, three days afterwards; Captain James Ross had judiciously ordered the limb to be rubbed with snow, and to be immersed in ice-cold water. On examination I found the foot much swollen, painful, and in a state of incipient gangrene: anodyne poultices were applied, but it soon became necessary to amputate, a measure which the man urged me to delay till Sir John Ross's return, and which I at length performed with a favourable result. The other cases were of minor importance, and all did well.

If the preservation of a uniform temperature by external means be of the highest importance, it must be admitted that the due and vigorous generation of caloric by a proper selection of food is not less so. The natural food of this climate seems well adapted to the purpose. Every one knows that solar caloric, caloric by combustion, and that generated by animal life, are the three chief sources by which our temperature is sustained. Now, it seems but reasonable that in a region where our supply from the two first is so exceedingly limited, the more active evolution from the last source should compensate for the deficiency. It is not so difficult, though certainly far from easy, to explain the laws of heat when exerted on inanimate matter, so as to produce the known vacillations of atmospheric temperature. But to explain these laws as influencing, and influenced by, the laws of vitality—in other words, to show how the affinities of matter

are antagonized by the power of vitality (or that we may not lead our readers to suppose there is any want of harmony in the code of laws by which Divine Providence at once governs the animate and inanimate, we will not say antagonized, but nicely balanced), this indeed has long puzzled, and will still puzzle, philosophers the most acute. There are, however, some facts upon which we can reason with interest and advantage to future navigators; and we have a theory fairly grounded on those facts, which has now withstood the test of nearly half a century, and which has been indeed modified by the careful process of induction from experiments,* but which has never been altogether refuted. To this I deem it my indispensable duty to direct the attention of any of my medical brethren, who may hereafter chance to visit these regions; for what is notoriously said of air in all parts of the world, may here also be said of heat, "we must have it or we die."

To the physiologist, and the general philosopher, my remarks, perhaps, appear commonplace, and certainly not original, but let him bear in mind that they are recorded only as a means of directing my successors to the importance of this subject, and to the necessity of adapting the *victûs ratio* accordingly. To proceed then, there are three modes by which heat is probably generated within the body—by the chemical decomposition which takes place in respiration, by the influence of the brain and nervous system, in some degree perhaps analogous to its development by galvanic influence, and by the process of digestion and nutrition.

If it be acknowledged that combustion goes on more rapidly in cold weather, and that this is wisely pre-ordained, the same remark applies to respiration, in which the imaginative poet and the cold philosopher alike recognise the resemblance. The heat generated will partly depend on the rapidity of the union of the impurities of the blood and the consequent liberation of caloric.

But it will partly depend on the quantity of carbon and hydrogen contained, and taken in with the food. On this ground alone, I expect the patience of my readers; for it will follow, if this be admitted, that such provisions should be selected for these expeditions as may have been found to contain these elements in the largest possible

* *Vide* Crawford's Experiments, Spalding on the Diving Bell, and the more recent experiments of Brodie, Phillip, and Le Gallois

excess, loosely combined, and in the most favourable state for elimination. We all know that articles of an opposite chemical constitution lower the temperature, such as nitre, acids, mineral and vegetable, and hence the failure of lime juice as an anti-scorbutic, unless aided by nutritious food. On reference to the food destined by nature for the support of the Esquimaux, we find it almost exclusively hydro-carbonaceous, oil, blubber, fish, and flesh, the two latter of which cannot be too fat for them. Here we see a strong analogy between their process of nutrition and that of combustion; nearly the same materials, the same play of affinities, the same results, the same change of latent into sensible caloric. That persons of a weakly digestion have no great conservative power with regard to temperature, is a matter beyond doubt; and the converse seems equally manifest. It is here we have to regard the felicity of an Esquimaux-constitution, for whatsoever improvement our appetites underwent among them, their inherent digestive powers exceeded ours out of all reasonable proportion.

If I am rightly understood, my readers must see that I contend that the gross diet of northern tribes is not a matter of chance, but in harmony with the slow but constant changes which are continually going on around them; and intended to enable them to resist cold, and to vigorously generate heat. Thus, as we witnessed, the mother was enabled safely to expose her naked infant, but a few days born, to an atmosphere of seventy-five degrees below our freezing point for several minutes; the heat being rapidly generated by the one, and as tenaciously retained by the other, for the child during this time was feeding at the breast. The influence of the nervous system in evolving heat is now generally admitted; its elimination in the process of digestion and nutrition, although not less certain, is still more difficult of explanation.

On a review of the journal of all the cases which came under my care, I can scarcely find room, in the limited space allowed me here, to do more than merely state that pneumonia, colds, simple fevers, and some cases of gastric disease, constituted the chief part of them. Duly considering the various difficulties and privations suffered by the crew, our mortality of three individuals will not be deemed either numerous or extraordinary.

CAPTAIN BACK.

BEFORE this sheet was put to the press, this intrepid and persevering officer arrived in London. It will be recollected, that in the spring of 1833, he volunteered his services in the most praiseworthy and disinterested manner to search for me and my companions, who had then been absent nearly four years. Immediately after our providential return, despatches were sent to him, which he received in May, 1834; and at the same time, directions to continue his survey of Great Slave river, the very existence of which was doubtful, principally with the view of uniting the coast between Cape Turnagain and Commander Ross's furthest beacon. The result of this enterprise has proved that the line of coast to the southward of the Isthmus of Boothia had not been completely examined, and that the information received by Commander Ross from the Esquimaux, making into a bay the land between the isthmus and Matty island, was incorrect; and thus opening a new field for conjecture; but, although it is very probable that the land to the westward of that inlet is an island, I am not of opinion that the western sea joins with Prince Regent's inlet. No one will deny that Captain Back, whose zeal, intelligence, and perseverance, has done so much, will be the fittest person to finish the work he has begun; and I have learnt with peculiar pleasure, that his Majesty, our august sovereign, having dispensed with the term of servitude established by the regulations of the navy to qualify him for the next step, has promoted him to the rank of Captain, as a reward (the most honourable) for his eminent services, and which will render it unnecessary for him to serve on board a ship, before he takes the command of another land expedition, which I hope he will soon undertake by order of government.

I cannot conclude without offering my grateful thanks, to the corporations of London, Hull, the Trinity of Hull, Liverpool, Bristol, and Wicklow, who have each conferred their freedom upon me, as also to the sovereigns of Russia, Prussia, Sweden, Denmark, France, Belgium, and above four thousand individuals, who have presented me with splendid and flattering testimonials of the sense they have entertained of my humble endeavours in the cause of science, but more especially for the kind interest which has been so universally felt for me and my companions.

BIOGRAPHY

THE VICTORY'S CREW.

BIOGRAPHY

THE VICTORY'S CREW.

THIS short Biographical Sketch of the Men, composing the Crew of the Victory, may not be found uninteresting to my Readers.

MR. THOMAS BLANKY, FIRST MATE.

MR. BLANKY was born at Whitby, in the year 1800; is five feet seven inches high, stout made, has a fair complexion, with light hair: went to sea at eleven years of age, and served an apprenticeship of six years in a collier, between Shields and London, on board two vessels, called the Liberty and the Property, after which he was one year in the coasting trade, and two years in the Greenland fishery, on board the Volunteer, of Whitby, where he filled the situation of line manager. He was twelve months in the Swan, revenue cutter, from which he went second mate of the Latona, for one voyage in the timber trade: after making a voyage as second mate of the Lord Wellington to Dantzic, he went two voyages first mate of a collier. In the year 1824 he volunteered to serve on board his Majesty's discovery ship, the Griper, Captain Lyon, and was on board her on that disastrous voyage to Cumberland strait. On her return he entered on board the Navigator, as second mate, and made a voyage to Alexandria; and then as first mate of the Sprightly, to Riga, and two voyages in the coal trade. In 1827 Sir E. Parry's attempt to reach the North Pole was undertaken, and he volunteered on board the Hecla as a leading man; but this attempt being also unsuccessful, he returned to the merchant service, making a voyage to Quebec, and another to St.

Petersburg, as first mate of the Almira; after which he joined an uncle as mate, who was master and owner of a schooner, but was wrecked soon after on Flamborough Head. When he joined the Victory as first mate, he had been eighteen years at sea, and had become an excellent seaman, of which he gave several remarkable proofs. I may mention that on the morning of the 12th of August, when his presence of mind and decision saved the ship from being thrown into the breakers of a heavy pack of ice. His education having been neglected in his youth, he attended very diligently to instructions given him on the voyage, and became an excellent navigator. Having been before a shipmate of Commander Ross, he naturally attached himself to him, and from whom he received much instruction. Although he was the spokesman on most of the occasions of discontent, particularly on the march from Victoria harbour to Fury beach, I do not blame him so much as those at whose instigation he committed the act of insubordination, and I had no hesitation in giving him my strongest recommendation to A. Chapman, Esq., M.P., who appointed him mate of one of his ships, which led to his obtaining the command of a merchant ship, and which all along seemed to be the sole object of his ambition.

MR. THOMAS ABERNETHY, SECOND MATE.

MR. ABERNETHY was born at Peterhead, in Scotland, in the year 1802, and was nearly six feet high, straight, and well made; had a florid complexion, dark eyes and hair, an aquiline nose, and was decidedly the best-looking man in the ship. He went to sea at the early age of ten, and served an apprenticeship of four years in the Friends, of Peterhead, in which he went one voyage to the West Indies, and two to Greenland; afterwards he went three voyages to Davis's straits, in the Hannibal; and after which he entered and continued in the coasting, Oporto, and American trade. In 1824 he joined the Fury, Captain Hoppner, and was wrecked in Prince Regent's inlet, sharing the hardships of that unfortunate voyage. After making a voyage in a merchant ship, he volunteered his services in the Polar Expedition of 1827, and was one of the most meritorious of Captain Sir Edward Parry's crew: for this, after serving the necessary time on board a ship of the line, he was promoted to the Blossom sloop of war, as gunner, and married the daughter of Mr. Fiddis, the carpenter who was with me and Sir E. Parry on all the previous voyages to the Arctic Regions. When he volunteered with me in the Victory, he had been seventeen years at sea, and was in my opinion the most steady and

active, as well as the most powerful man in the ship: he was one of those who volunteered to proceed to the westward, on the first journey with Commander Ross. I had no hesitation in recommending him strongly to the Admiralty, and he was accordingly promoted to his Majesty's ship Seringapatam, as a reward for his meritorious services.

MR. GEORGE TAYLOR, THIRD MATE.

MR. TAYLOR was born at Lancaster in the year 1800; is five feet four inches and a half high; has blue eyes, brown hair, and a good complexion. He served his apprenticeship of five years to the trade of a ship carpenter, at Ulverston, in Lancashire, in the building-yard of James Hart, Esq. A short period after his time was served, he entered as carpenter of a merchant vessel, and served three years as second mate and carpenter of the Six Sisters, of Liverpool, employed in the timber trade, and subsequently in another ship belonging to Hull, before he joined the Victory steam-vessel, where I found him doing duty as master when I purchased her at Liverpool. He volunteered in the first instance to carry the vessel to London, where he was employed while the vessel was fitting out, and behaved himself so well that I made him third mate. In 1830, while on a journey with Commander Ross, he got his right foot frostbitten; and being in the first instance neglected, ended in the amputation of his foot, two inches above the toes, since which he was unable to do any active duty, but was nevertheless very useful. He could walk very little during the remaining three years, and he had often to be carried on the sledge on our march from Victoria harbour to Fury beach. In 1832, on leaving Batty, on the 1st of October, we attempted to carry him on the substitute for a sledge, which we made from the staves of casks; but being quite unable, we were obliged to leave him twice, and I myself returned with the empty sledge to bring him, for which he was always grateful. He was one of the most trusty I had of the crew, and was the person who detected William Light, the steward, purloining my allowance of provisions. When he returned home I provided for him a situation in the Dock-yard, but he preferred going to Liverpool, where his wife and family were, and had been supported by Sir Felix Booth in his absence.

MR. CHIMHAM THOMAS, CARPENTER.

MR. THOMAS was born at Devonport in 1792; was five feet three inches high, blue eyes, and sallow complexion. His father was a caulker in his Majesty's Dock-yard at