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mained in the insoluble residue. The silicate decomposed by acids containing lime is most probably either anorthite, labradorite or a lime-olivine. The large portion of magnesia and iron insoluble in acid indicates the presence of a pyroxenic mineral. Further investigation is needed to fully establish the specific character of the constituent minerals of this meteorite, although we are justified in concluding that it contains an olivine, a pyroxenic mineral and a feldspar, besides chromite, troilite and a very small amount of niccoliferous iron. I think by sacrificing a large portion of this stone that its constituent minerals could be mechanically separated from each other by careful selection with the aid of a magnifier, and their specific characters accurately determined by analysis. At present I do not feel at liberty to undertake this, but hope at some future time to return to the study of this problem.

In general physical characters this meteorite very much resembles the Petersburg, Tenn., meteoric stone anlayzed and described by Prof. J. Lawrence Smith.* It has the same lustrous coating, and the constituent minerals are very much the same in character. It seems to belong to the class of meteorites that Prof. G. Rose† calls *Howardite*, and which he describes as being granular mixtures of olivine, with a white silicate (*anorthite?*) and a small amount of chromite and niccoliferous iron. This class, according to Rose, includes the stones from Loutalox, Bialystok, Mässing, Nobleborough and Mallygaum.

I take pleasure in expressing my thanks to Mr. Hooper for his generosity in placing the stone at my disposal for examination, and to Mr. Pybas for his great interest in furnishing the data connected with its fall.

Sheffield Laboratory of Yale College, May, 1869.

ART. XXVI.—*Contributions to Zoölogy from the Museum of Yale College.* No. III.—*Descriptions of some new American Phyllopod Crustacea;*‡ by A. E. VERRILL.

ARTEMIA Leach.

THIS interesting genus is remarkable for its habit of living and flourishing best in very saline and alkaline waters, such as the natural salt lakes of Egypt, Utah, etc., and the artificial brines formed by the evaporation of sea-water by exposure to the heat of the sun, as in England, France, and the West Indies.

* This Journal, II, xxxi, 264.
† Beschreibung und Eintheilung der Meteoriten, p. 107.
‡ Abstract from a paper read before the American Association for the Advancement of Science, Salem, Mass., Aug., 1869.

The species first made known, *A. salina* Leach (*Cancer salinus* Linn.), was first described by Schlosser,* who found it in great profusion in the brines of Lymington, England. Linné indicates it also from the salt lakes of Siberia (perhaps a distinct species) and probably the same as that observed by Pallas† in great numbers in the Great Schimélée. More recently it has been described from the salterns of southern France, at Montpellier, etc.‡ The genus has been found also in the Lakes Goumphidich, Amaruh and Bédah in Egypt, which are reported to be both very saline and alkaline, their bottoms being "covered with a layer of crystals of carbonate of soda, sulphate of soda, and common salt," while the density of the water is stated at 1·255. The Egyptian species appears not to have been described as yet.§ In the Antilles *A. Guildingi* Thompson occurs.‖ *A. Mulhausenii* Edw. (Fischer sp.) is found in Lake Loak in the Crimea.¶ A few years ago Prof. Silliman presented to the museum of Yale College a number of specimens of a new species, *A. Monica* V., which he collected in Mono Lake, California, where it occurs in great abundance associated with the larvæ of *Ephydra*.** The water of this lake is very dense, and not only very saline, but also so alkaline that it is said to be used for removing grease from clothing. I have been unable, however, to find any reliable analysis of this water. It is said to contain, also, biborate of soda. Prof. Silliman informs me that the genus also occurs in Little Salt Lake. It occurs in great abundance in Great Salt Lake, Utah, as I am informed by Prof. D. C. Eaton, who ob-

* Observations périodiques sur la physique, l'histoire naturelle et les beaux-arts, par Gautier, 1756, (with figures). An extract from this is republished in Annals des Sciences nat., 2e ser., t. 13, p. 226, 1840, in an elaborate description of the anatomy, development, habits, etc., of *Artemia salina* by M. Joly, illustrated by two excellent plates of the female and young. M. Joly failed to observe the male among more than a thousand females, and therefore doubted whether the sexes were distinct, suggesting that the males very well described by Schlosser were only the young, although that author described them as clasping the females in the well known manner, but he did not observe the actual copulation.

See also an article by Thomas Rackett, in Trans. Linn. Soc. of London, vol. xi, p. 205, pl. 14, 1812, (figures very bad); Thompson, Zoölogical Researches, No. 5, p. 105 t 1 and 2; W. Baird, Nat. Hist. of the British Entomostraca, p. 61, tab. ii, figs. 2-4, (figures very good, but the specimens probably not full-grown).

† Voyage en différentes provinces de l'empire de Russie, t. ii, p. 505, (t. Joly).

‡ M. Payen, Note sur des animaux qui colorent en rouge les marais salans, Ann. des Sci. nat., 2e ser., t. 6, 1836, p. 219 (contains experiments on the effects caused by altering composition and density of the water); also op. cit., t. 10, 1838, p. 315; Joly, op. cit., t. 13, p. 225, 1840 (see above); Milne Edwards, Crustacés, t. iii, p. 369, 1840.

§ Audouin, Ann. des Sci. nat., 2e ser., t. 6, 1836, p. 230.

‖ Thompson, Zoöl. Researches, fas. 7, pl. 1, figs. 11–12.

¶ Edwards, Crustacés, t. iii, p. 370, 1840.

** Verrill, Proceedings Boston Soc. Nat. Hist., vol. xi, p. 3, 1866, (the larvæ were wrongly referred to *Eristalis*); Packard, on Insects inhabiting salt-water, Proc. Essex Inst., vol. vi, p 41, 1869.

tained specimens there during the present summer, but these have not yet come to hand. The water of Great Salt Lake has usually been described by travelers as destitute of all life, but according to Prof. Eaton it contains not only an abundance of *Artemiæ*, but also various other small animals, insect larvæ, etc. The density of the water is stated at 1·170°, but doubtless varies much according to the season.* It yields, according to Dr. Gale, over 22 per cent of solid matter,† while the Syracuse Saline, one of the richest natural brines in the United States, contains but 19·16 per cent.‡ A few weeks ago Mr. Oscar Harger discovered another new species, *A. gracilis* V., near New Haven under very peculiar circumstances. On the long wooden bridge across West river and the extensive salt marsh on the West Haven side, are placed large wooden tubs filled with water from various pools on the marsh, to be used in case of fire. By long exposure to the sun and air the water in these becomes concentrated and thus furnishes suitable stations for the rapid increase of *Artemiæ*. On examining the tubs the first of August I found eight of them partly filled with water, in six of which the *Artemiæ* were found in abundance, though more numerous in one than in any of the others. In one tub, in which the water had a decidedly milky appearance, they were so abundant that hundreds could be obtained in a few minutes. The water in some of the other tubs containing them was of a reddish or brownish hue, or about the color of weak tea. In two no Artemiæ could be seen, and in these the water appeared to have been more recently renewed. Search was made in the pools from which the water had been taken, but no *Artemiæ* were found, though doubtless from these places the progenitors of those inhabiting the tubs must have been taken. It is probable that in the pools they exist in very small numbers, being kept in check partly by various small fishes and other enemies and partly by the unfavorable character of the water, while in the tubs the density of the water is more favorable for their rapid increase, and unfavorable or fatal to their enemies.§ The water

* The density of the water of the Atlantic ocean is stated at 1·020; that of the Dead Sea 1·130 to 1·227.

† This solid matter, according to Dr. Gale, (this Journal, II, vol. xvii, p. 129), has the following composition:

Chlorid of sodium,	20·196
Sulphate of soda,	1·834
Chlorid of magnesium,	·252
Chlorid of calcium,	trace
	22·282

‡ For analyses of several of these brines, see Dana's System of Mineralogy, p. 113.

§ The density of the water in two of the tubs containing most *Artemiæ*, was 1·065, equivalent to a brine containing 9·07 per cent of salt. One of those tested was brownish, the other milky.

from the tubs, when examined with a high power of the microscope, was found to be filled with immense numbers of infusoria of various kinds, such as monads, vibrios, and bacteria, most of which were so small as to be distinguishable only as moving points with a $\frac{1}{5}$ inch objective.

In the salterns of France the *Artemiæ* are associated with immense numbers of a monad, usually bright red in color, which has been named *Monas Dunalii* by Joly, who attributes to it the red color which the brine assumes just before crystallization,* as well as the red color observed in the *Artemiæ*, which doubtless feed upon it, as well as upon various other living infusoria, and dead animal and vegetable matter of various kinds.† The *Monas Dunalii* appears in abundance in the water having the density most favorable for *Artemia*, but increases in far greater proportion in the still denser, nearly or quite saturated brine in which *Artemia* does not live. The observations of Payen and Joly show that the *A. salina* of France can exist in waters varying in density from 4° to 20° Baumé, but that they flourish best in those that have a density of 10° to 15°.‡ According to Rackett those of Lymington do not live in the water which is undergoing the first stage of concentration, but only in the pans of concentrated brine, containing about "a quarter of a pound of salt to the pint."

Our *A. gracilis* can exist without apparent inconvenience when the water in which they occur is diluted with an equal bulk of fresh water as well as when it is much concentrated by evaporation. The water in which they were found varies in density from 1·060 to 1·065.

The genus is characterized by having eleven pair of four-jointed branchial "feet" or fins along the sides of the body, the middle ones being longest. Each joint of the "feet" bears flat branchial appendages, ciliated by sharp setæ, as in the other genera of the family. The abdomen is slender, six-jointed, the last joint long, terminated by two small projecting appendages, each bearing six to ten plumose setæ. The first abdominal segment bears the external sexual organs of the male, and a short, dilated, ovigerous pouch in the female. In the male the head bears in front a pair of large, three-jointed hooks or clasping organs, each of which has on the inner side of its basal joint a

* Researches sur la Coloration en rouge des Marais Salans Méditerranéens, par M. Joly, Annals des Sciences naturelles, 2e ser., t. 13, 1840, p. 266.

† According to M. Joly, op. cit. p. 262, a beetle, *Hydroporus salinus* Joly, also inhabits the salterns, where the water has a density of 6° or 7° Baumé, and preys upon the *Artemiæ*.

‡ 4° to 20° Baumé is equivalent to a density of about 1·02 to 1·16; 10° to 15° =1·075 to 1·117. A brine having a density of 1·020, which is nearly that of sea-water, contains about 2·766 per cent of salt; one of 1·160 contains 21·219 per cent; one of 1·075 about 10·279 per cent; 1·117 about 15·794 per cent.

small, rounded, appendage; a pair of slender antennæ just back of these, terminated by two or three minute setæ; a pair of pedunculated compound eyes, and a dark spot on the middle of the head, which is the remains of the single eye of the young. The mouth below is provided with a broad labrum, a pair of mandibles, two pairs of jaws, and a pair of lateral papillæ. In the female the head lacks the stout claspers, which are replaced by a pair of comparatively small, simple, horn-shaped organs.

Artemia gracilis Verrill, sp. nov.

Body slender, in the male about ·3 of an inch long, in the female ·4. Claspers of the male relatively long and powerful, first joint thickened, with a distinct angle at the articulation on the outside and a short, rounded, nearly semicircular process on the inside near the base, about its own diameter from the base; second joint broad, flattened, continuous with the third joint, strongly curved, outline nearly regularly convex on the outside, until near the middle it suddenly bends inward forming an obtuse angle, beyond which the outline is concave to the last articulation, where it becomes again convex, forming on the last joint a slight, rounded angle, the inner edge is nearly straight, or but slightly concave, to the last articulation, where there is a slight but distinct angle; last joint triangular, longer than broad, tapering to the acute, slightly excurved point. Antennæ slender, elongated, reaching beyond the first articulation of the claspers, terminal setæ minute. Abdomen slender, smooth, the terminal lobes small, longer than broad, broadly rounded at the end, slightly constricted at the base inside, each bearing usually 7 or 9 plumose setæ, the central ones much the longest. Ovigerous pouch of the female, when seen from below, flask-shaped, the neck extending backward and downward, short, thick, subcylindrical toward the end, the body of the "flask" short, thick, swollen laterally, broader than long, the sides terminating outwardly in a small, triangular, sharp tooth, sometimes showing a minute spine. This pouch is generally filled with numerous large, brownish eggs.

Color generally reddish, flesh-color, or light greenish, translucent, the males usually lighter, greenish white, the intestines generally showing through as a dark reddish or greenish median line; eyes very dark brown, or black; ovaries often whitish, along each side of the abdomen.

An adult male gives the following measurements:

Distance between eyes 1·81^{mm}; breadth of head ·76; length of eye-stalks ·62; length of first joint of the claspers ·91; its breadth ·72; breadth of its appendage ·18; length of second and third joints from outer edge of first articulation to the tip 2·48; greatest breadth ·86; breadth at last articulation ·72; length of last joint 1·05; length of last joint of abdomen, exclusive of appendages, 1·00; its breadth ·31; length of preceding joint ·42; its breadth ·37; length of terminal appendages ·21; breadth ·096; length of longest setæ ·70.

Near New Haven, in tubs of water from salt marsh.

Artemia Monica Verrill, sp. nov.

Form similar to that of the preceding species, but a little larger and stouter. The largest female is 13^{mm} (·52 of an inch) long, the abdomen being 6^{mm}; and 5^{mm} across the branchial feet in their natural, partly extended position. The largest male is 11·5^{mm} (·45 of an inch) long, the abdomen being 6^{mm}. The claspers of the male are relatively stouter, the hook or outer two joints being much broader, more triangular, and less elongated. The inner edge of the first joint, as seen from below, is regularly convex, bearing the appendage on its most convex part and not so near the base as in *A. gracilis*, the distance being about twice the breadth of the organ, which is about as broad as long and regularly rounded. At the articulation the outer edge of the joint projects as a distinct angle. The second and third joint together have a nearly triangular form, the breadth being about half the length; the outer edge is regularly rounded, shorter than in the preceding; it forms little more than a right angle with the front edge, which is nearly straight or a little concave, sometimes slightly convex at the last articulation, but not forming a distinct angle there; the inner edge of the hook is a little concave on the first joint, becoming convex at the last articulation where there is a distinct but very obtuse angle. The last joint is almost regularly triangular, about as broad as long, tapering to an obtuse point, the inner edge being a little convex. The antennæ are very slender and do not reach the first articulation of the claspers. The caudal appendages are smaller than in *A. gracilis*, and scarcely longer than broad, rounded at the end, terminated by nine or ten very slender plumose setæ. The egg-pouch of the female is broad flask-shaped, strongly convex in the middle below, the sides not forming such sharp angles as in *A. gracilis*.

The English specimens of *A. salina*, as figured by Baird, differ from both the preceding species in having longer, more curved, and sharper clasping hooks, and the basal appendage more elongated; the egg-pouch, though badly figured, is of a very different form. The French specimens, as figured by Joly, appear like a distinct species, the egg-pouch being of a very different form, and the caudal appendages very much longer and

larger than in either of our species, while Baird's figure represents them as very small; but his specimens appear to have been smaller, and may have been immature, for these species begin to breed before they are half grown. Whether the French species be distinct from the English can only be determined by additional examinations, especially of the male, for the male of the former appears not to have been figured hitherto.

BRANCHIPUS Shœffer.

Branchipus Shœffer, Elementa entomologica, 1766, (type, *B. pisciformis*=(?) *B. stagnalis* Linn. sp.).

Branchipus (*pars*) Lamarck; Latreille; Leach; Edwards.

Chirocephalus (*pars*) Dana, (non Bénédict-Prévost, 1803; Jurine; Thompson; Baird).

Under the name of *Branchipus* at least four generic groups have been confounded by various authors.

Branchipus should be restricted to the original species described by Shœffer and the allied species, of which *B. stagnalis* (Linn. sp.) is one, and if not identical with *B. pisciformis*, as is generally supposed, must be closely allied.

As thus restricted the genus is characterized by the stout, two-jointed claspers of the male, with or without a tooth near the base of the hook, the basal joint being swollen; by having a pair of simple appendages resembling antennæ between the bases of the claspers in front; by the large, thick, oval egg-pouches of the female, and, apparently, by the structure of the branchial organs. It includes *B. stagnalis*, *B. spinosus* Edw., *B. vernalis* Verrill, sp. nov., etc. Perhaps *B. paludosus* Müller also belongs here.

Branchinecta.—A group of species allied to these,—but destitute of all appendages between the bases of the claspers of the male, which are more slender and simple; with a much elongated egg-pouch, having lateral lobes at the base; a more slender body, with more elongated branchial organs, the middle ones longest; and having, in general appearance, a much stronger resemblance to *Artemia*,—probably constitutes another genus, but for the present we prefer to regard it as a subgenus of *Branchipus*.

For this group we propose the name *Branchinecta*. It includes two new arctic species, *B. Grœnlandica* and *B. arctica*, and *B. ferox* (Edw. sp.) from near Odessa.

Heterobranchipus.—Dr. Loven* has described a singular species, *B. Cafer*, which appears worthy to constitute a distinct genus. It is remarkable on account of the very curious claspers of the male, which are very long, three-jointed, flexuous, the

* Kongl. Vet. Akad. Handl, 1846, p. 433, tab. V.

basal joint bearing a long cirrus externally and a lacerate tooth on the inner side of the base, the outer joint bifid, the internal part cirriform, the external one deeply bilobed. External male organs very long, slender, curved, outer portion serrate on the outer edge, with short setæ on the inner edge; egg-pouches long, slender, slightly enlarged and beaked at the end; branchiæ of a peculiar structure; front of head, between the claspers, with a short bimucronate rostrum.

H. Cafer is from the marshes of Natal, South Africa.

Chirocephalus Prevost, 1803.—This genus, established for *C. diaphanus*, is evidently very distinct from all the preceding. The typical species is large, stout, and remarkable for the singular appendages between the claspers of the male, on the front of the head. These consist of two long, ligulate, fleshy processes, serrated on each side, which coil in a spiral beneath the head, but when extended, as in copulation, reaching beyond the claspers; attached to the outer side of each of these are four long processes, strongly serrate on the inner edge, and near the base another large, broad, thin, subtriangular appendage, its edges strongly serrate, especially in front, capable of folding up like a fan when not in use. The claspers have a much swollen basal joint, a strongly serrate tooth on the inside of the base of the second joint, which is beyond this slender and regularly curved. Egg-pouch long-oval, large and thick; caudal appendages large; male organs and branchiæ peculiar.

C. diaphanus Prev., inhabits fresh water pools in France, Switzerland, and England. It is well described and figured in Baird's British Entomostraca, p. 39, tab. III and IV.

Branchipus vernalis Verrill, sp. nov.

Form rather stout, large; the full grown females are 23^{mm} (·90 of an inch) long, the abdomen being 14^{mm}; and 6·5^{mm} wide across the branchial organs in their natural position; breadth of head across the eyes 4^{mm}. A large male is 22^{mm} (·86 of an inch) long, the body 12^{mm}; the breadth of head across eyes 5^{mm}; the entire length of claspers 8^{mm}. The claspers are very large and strong, the basal joint much swollen with a soft integument, capable of retracting the basal portion of the second joint into itself by involution of its outer edge; the second joint is elongated, broad and stout at base, with an angle on the outside, from which it rapidly narrows by strongly concave outlines on each edge, but most so on the outside; at the constricted portion, not far from the base, it bears a large, strong, very prominent, crooked, bluntly pointed tooth, which is directed inward and backward, not serrate on its outer side; beyond the tooth the rest of the joint is long and

rather slender, curved outward and forward at base, having just beyond the tooth on the inside a distinct but very obtuse rounded angle, from which the outline slightly curves inward to near the tip, which is a little dilated and recurved. The basal portion, including the tooth, is retracted into the first joint in some specimens. On the front of the head between the basal joints of the claspers are two flat, short, lanceolate, ligulate, fleshy processes, with finely serrate edges, usually coiled down, but when extended scarcely more than half as long as the basal joint of the claspers. Antennæ small and very slender, tapering, reaching a little beyond the eyes. Caudal appendages long, rather narrow, slightly swollen at base, gradually tapering to the acute tips, and bearing along the sides, except at base, very numerous, long plumose setæ. Egg-pouches short, broad-oval, nearly as wide as long, slightly three-lobed posteriorly, the central lobe largest, sides extended and largely adherent to the sides of the abdomen, length 4^{mm}, width 3·5. Body flesh color or pale red, the intestine darker red or greenish.

A large male gives the following measurements: length of first joint of claspers 4·62^{mm}; diameter 2·40; length of second joint 4·14; breadth at base 1·90; at tooth ·72; in middle ·52; length of tooth ·90; its diameter ·33; length of caudal appendages 4; breadth at base ·33; in middle ·20; length of setæ 2; length of antennæ 3.

New Haven, in stagnant pools,—J. D. Dana, D. C. Eaton, A. E. Verrill; Salem, Mass., April 19, 1859, R. H. Wheatland, C. Cooke (from Essex Institute); Cambridge, Mass., A. E. Verrill.

This species differs widely from all described species of Europe, in the character of the claspers of the male and their appendages. *B. stagnalis* has a pair of long setiform organs between the claspers, and a tooth on the outer side of their second joint; *B. spinosus* resembles our species somewhat in the frontal appendages between the claspers, but lacks the conspicuous tooth at the base of their second joint. The shape of the egg-pouch in our species is also characteristic.

This is doubtless the species referred to by Dr. Gould under the name of *Branchipus stagnalis*.* Dekay† copies the diagnosis of *B. stagnalis* (*?*) from a foreign work, and gives a figure of *Chirocephalus diaphanus*, copied apparently from Desmarets, pl. 56, which is itself a copy.

* Invertebrata of Massachusetts, p. 389.

† Natural History of New York, Zoölogy, Part I, Crustacea, p. 63, pl. ix, fig. 36.

This species appears very early in spring, often in great numbers, in quiet pools. I have never seen it later than the middle of May, yet since the individuals seen in early spring are full-grown, it might, doubtless, be found also in autumn.

Branchipus (*Branchinecta*) *arcticus* Verrill, sp. nov.

Branchipus paludosus Packard, Invertebrate Fauna of Labrador, in Mem. Boston Soc. Natural History, i, p. 295, (*non* Müller).

Form slender, body short, abdomen elongated. A full sized male is 20^{mm} (·80 of an inch) long, exclusive of the claspers, the abdomen being 13^{mm}; the breadth between the eyes 3^{mm}. A female 20^{mm} long, with the abdomen 12^{mm}, has an egg-pouch 6·2 long. Branchial "feet" slender, elongated, the middle ones longest, 4 to 5^{mm} long when extended. Claspers of the male rather long and slender; the basal joint is but little swollen, elongated, regularly curved, with a small tooth or prominent angle at the articulation on the inside, and on the inner side a row of numerous small, distinct, sharp teeth, extending from the articulation about half way to the base, and arranged somewhat obliquely; second joint slender, regularly curved, tapering to a blunt point, the inner edge minutely serrulate. Front simply curved, with no appendages. Antennæ slender, scarcely more than half the length of the basal joint of the claspers. Labrum long and narrow, mandibles stout, strongly curved, bluntly pointed. Caudal appendages slender lanceolate, rather small, with long slender setæ. Egg-pouch much elongated, slender, subcylindrical, beaked or slightly bilobed at the end, the upper or dorsal lobe longest, its basal portion with two small rounded lateral lobes.

A large male gives the following measurements: breadth between outer extremity of eyes 3·46^{mm}; diameter of eyes ·66; length of basal joint of claspers 1·66; breadth ·71; length of second joint 1·29; breadth at its base ·46; width of mandibles at middle ·66; length of caudal appendages ·96; breadth at base ·16; length of longest setæ ·84 to 1^{mm}.

Color of preserved specimens pale reddish, with dark green intestine. Labrador, at "Indian Tickle" on the north shore of Invuctoke Inlet, abundant in a pool of fresh water,—Dr. A. S. Packard.

Branchipus (*Branchinecta*) *Grænlandicus* Verrill, sp. nov.

A little stouter than the last; the largest male is 17^{mm} long exclusive of claspers, the abdomen being 10^{mm}, including caudal appendages. Claspers similar to those of *B. arcticus* but more elongated, the basal joint less curved, and the second joint longer, less regularly curved, tapering more quickly at base and consequently more attenuated beyond the middle and with more slender tips, which are nearly straight. The tooth on the in-

side of the first joint is rather more prominent, but the row of teeth along the inside is similar. Caudal appendages stouter, tapering more rapidly. External male organs slender, curved outward, swollen at base. The largest female is not mature and the egg-pouch contains no eggs; it is small, slender, elongated, subcylindrical, beaked at the end.

The largest male gives the following measurements: breadth between eyes 3·20^{mm}; length of basal joint of claspers 2·81; breadth ·95; length of second joint 2·24; its breadth at base ·76; length of caudal appendages ·86; width at base ·24; length of setæ ·76.

Greenland,—Dr. Chr. Lutken, (from the University Zoölogical Museum, Copenhagen.)

Of this species I have seen but four specimens, which were sent to Dr. A. S. Packard by Dr. Lutken under the name of *B. paludosus* Müller. The latter appears to be quite distinct, to judge from the figures; it is represented as having appendages between the claspers, and very slender, linear, caudal appendages. In the form of the egg-pouch, and the serration of the first joint of the claspers it is similar.

This species is very closely allied to *B. arcticus*, and when a larger series of specimens can be examined it may prove to be only a local variety, but the specimens studied show differences that seems to warrant their separation.

ART. XXVII.—*On the Lesleyite of Chester Co., Penn., and its relations to the Ephesite of the Emery formation near Ephesus, Asia Minor;* by J. LAWRENCE SMITH.

SEVERAL years ago a small amount of mineral from Chester Co., Penn., was handed to me for examination by Dr. Isaac Lea, of Philadelphia. The specimen was too impure to warrant any conclusion upon analysis. Its character and associates, however, led me to suppose that it was the same mineral described by me as associated with the emery of Asia Minor and to which I gave the name *Ephesite*. In the mean time Dr. Lea described his mineral as a new species, calling it *Lesleyite*; and in a recent number of the American Journal of Science, S. P. Sharples has given an analysis of it, that at once brought to my recollection my original opinion that it was close to *Ephesite*, and on recurring to my examination of this mineral, making due allowance of the impurities contained in it, the opinion was confirmed.

I then obtained from Dr. Lea another specimen of his mineral and proceeded to analyze both it and the Ephesite for mutual comparison. Much labor was bestowed in selecting the pure

mineral from each, the greater part of a day having been consumed in procuring the necessary quantity for analysis. They are similar in their associations and identical in color and luster, and general physical properties. They are both very difficult to decompose by carbonate of soda, even when aided with caustic potash; so that in both analyses the silica obtained was fused a second time and much alumina separated from it.

My original description of the mineral will be found under Emery, in this Journal, II, vol. x, 1850, as follows:

"It is of a pearly white color, and lamellar in structure; cleavage difficult. It scratches glass easily, and has a sp. gr. of from 3·15 to 3·20. Heated before the blowpipe it becomes milk-white but does not fuse. At first sight it might be taken for white disthene. It is decomposed with great difficulty by carbonate of soda even with the addition of a little caustic soda."

The Lesleyite has identically the same properties. On analysis the two minerals were found to be composed as follows:

	Ephesite.	Lesleyite.
Silica	30·70	31·18
Alumina	55·67	55·00
Lime	2·55	0·45
Soda	5·52	1·20
Potash	1·10	7·28
Water	4·91	4·80
	100·45	99·91

The alkalies in the two varieties are reversed, the Ephesite containing principally soda, and the Lesleyite potash.

This close relation of the two minerals is an interesting fact as regards the associate minerals of corundum found in different parts of the world.

In regard to the reddish variety of Lesleyite examined by Roepper, the analysis cannot be considered as giving very satisfactory results, for the mineral may have been impure, and the difficulty in decomposing by the soda fusion may give very erroneous results in a silica determination.

Louisville, Ky., August, 1869.

ART. XXVIII.—*On the Origin of the Comets of* 1812 *and* 1846 IV; by Prof. DANIEL KIRKWOOD.

THE comet of 1812 was discovered by Pons on the 20th of July, and continued to be observed till about the last of September. It became visible to the naked eye shortly after its discovery, its tail attaining a length of more than 2°.