The National Science Foundation's Office of Polar Programs sponsored Norbert Wu on an Artist's and Writer's Grant project, in which Peter Brueggeman participated. One outcome from Wu's endeavor is this Field Guide, which builds upon principal photography by Norbert Wu, with photos from other photographers, who are credited on their photographs and above. This Field Guide is intended to facilitate underwater/topside field identification from visual characters. Organisms were identified from photographs with no specimen collection, and there can be some uncertainty in identifications solely from photographs.

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Feb 2017: Taxonomic names checked on World Register of Marine Species www.marinespecies.org
Solmundella bitentaculata is found in the Atlantic, Pacific, and Indian Oceans and the Mediterranean and is particularly common in the southern hemisphere; it has been found throughout Antarctica and in New Zealand, southern Australia and Chile [1,3,5]. Found at depths from the surface down to 1,100 meters, S. bitentaculata is usually found between 100 and 500 meters [1,3]. S. bitentaculata can be up to 7.2 centimeters wide and is higher than wide [1]. S. bitentaculata has thick apical jelly and the apex of the bell tends to be sharp-edged and keel-shaped, with the line of the keel between the two long tentacles [3,5].
Here's *Solmundella bitentaculata* taken from above, looking down at its central circular mouth, which opens to the aboral surface. Its two long tentacles issue from near the apex of its umbrella and are up to ten centimeters long [3].

*S. bitentaculata* swims with those two tentacles held in front of its umbrella, rather than trailing like most medusae.

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Here's a line drawing of *Solmundella bitentaculata* to see all of its features [1]. In this drawing *S. bitentaculata* is not in its swimming posture because its two tentacles are trailing behind the umbrella rather than being held in front of the umbrella.

*S. bitentaculata* can have the hitchhiking hyperiid amphipod *Hyperiella dilatata* on its exumbrella [2]. One prey item of *S. bitentaculata* is the shelled pteropod *Limacina helicina antarctica* [2,4].

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Leptomedusae have a hemispherical or flattened umbrella and have gonads on radial canals [1].

Gelatinous carnivores are a predominant and sometimes the main component of the macroplankton and nekton community in the Southern Ocean [2]. Gelatinous carnivores are important components of the food web because they are a control mechanism for its structure [3].

Trachymedusae have the margin of their umbrella entire and not divided into lobes, have a thickened marginal nematocyst ring, have radial canals with their gonads usually confined to those radial canals, and have solid or both solid and hollow marginal tentacles [1].

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Bargmannia species are the only physonect siphonophores with siphosomal (tail-end) tentacles and they also lack dactylozooids (defensive stinging individual zooids) [3].

Siphonophores are swimming/floating colonies consisting of different zooids specialized for feeding, sensing, flotation, and reproduction [1]. Siphonophore colonies bud from a stem whose gastrovascular canal is continuous with the canals of all the zooids in the colony [1]. Physonect siphonophores have an apical gas-filled float with a budding zone on either side of the base [1]. Siphonophores occur throughout Antarctica and subantarctic waters, with warm-water species observed in high latitudes during the spring and summer and cold-water species surviving at low latitudes during the winter [2]. Siphonophores are active predators, feeding on other plankton like fish larvae and krill [2].

athecate hydroid *Zyzzyzus parvula*

*Zyzzyzus parvula* has been collected in Antarctica from depths of 3 to 144 meters [1,8].
Zyzyzus parvula has a distinctive dark reddish-brown or brick-red color with about 30 aboral tentacles, each about 1 centimeter in length \cite{3,5}. Z. parvula has been collected at sizes up to 3.5 centimeters in length \cite{2,3}. Z. parvula may have a sudden diminution in diameter about halfway from its base to the tentacles \cite{3}.
Here’s a closeup of the hydranth (head) of *Zyzyzus parvula*. The reddish-white beads are the reproductive sex cells (gonophores) which arise in the space between the oral and aboral tentacles. After fertilization, those gonophores containing eggs develop free-swimming medusae borne from stalks above the aboral tentacles; the medusae have a pointed apex and apical canal, with one extensile marginal tentacle with beads of sting-cells [6].

The small tentacle-fringed structure rising up in the middle of the gonophores is the hypostome with the hydroid's mouth and smaller oral tentacles at the end.
Here *Zyzzyzus parvula* is living in an ice pocket.

*Z. parvula* is a conspicuous member of Cape Armitage’s second benthic faunal zone between 15 and 33 meters depth; its distribution is patchy [7]. *Z. parvula* is also a conspicuous member of McMurdo Sound's third benthic faunal zone below 33 meters depth [7].
Zyzyzus parvula preys on benthic species, primarily diatoms, but also amphipods, copepods, nematodes, invertebrate eggs, sea urchin juveniles, and hydrozoans [8].
Taxonomic Note: Genus was changed from Lampra [3] to Corymophara in 1972 [2], though it was referenced earlier in 1949 and 1967 as Corymophara parvula [4-9]. Listed as Corymophara in 1979 [1]. The parvula species was assigned to the Lampra genus in 1999 [13], assigned to the Monocaulus genus in 2001 [10] (the illustrations of the parvula and microrhiza species in this 2001 publication appear switched [12,14]), and assigned to the Corymophara genus in 2009 [11]. The genus is properly Zyzzyzus; the firm perisarc in the lower part of the stem and the gregarious habit are indicative for Zyzzyzus, which is defined by the way it attaches to the substrate [12,14,15].

athecate hydroid *Corymophora* sp.
Here's a closeup of the hydranth (head) of the hydroid. The small pale orange beads are the reproductive sex cells (gonophores) which arise in the space between the oral and aboral tentacles. The pink tentacle-fringed conical structure rising up in the middle of the gonophores is the hypostome with the hydroid's mouth and smaller oral tentacles surrounding the mouth.
After fertilization, those gonophores containing eggs develop free-swimming medusae borne from stalks above the aboral tentacles; the medusae have a pointed apex and apical canal, with one extensile marginal tentacle with beads of sting-cells.
Taxonomic Note: The specimen described by Hickson & Gravely as *Lampra microrhiza* is in a poor state and is generic; it seems similar to the hydroid shown above but could be any of several species [1,2,7]. The *microrhiza* species of Hickson & Gravely was assigned to *Corymorpha* in 1972 [3], assigned to *Lampra* in 1999 [4], assigned to *Monocaulus* in 2001 [5], and then assigned to *Corymorpha* in 2009 [6].

athecate hydroid similar to *Ectopleura crocea*

These hydroids are usually colonial, forming a tangled mat with long unbranched stalks, a thin perisarc covering, and are attached to the substrate by stolons [1,2,4,11]. These hydroid colonies do not anchor by rooting filaments as do the solitary *Monocaulus* hydroids [1,2,3].

These hydroids have two sets of filiform tentacles (long, slender tentacles with stinging cells scattered along their length): the short, numerous, and densely crowded oral tentacles and the longer basal aboral tentacles in a single whorl [1,2,3,11].

On the hydranth (head) of these hydroids, the small beaded area between the oral and aboral tentacles are the reproductive sex cells (gonophores). The tentacle-fringed conical structure rising up in the middle of the gonophores is the hypostome with the hydroid's mouth and smaller oral tentacles at the end.

Hydroids have a complex life cycle -- a sexual reproduction stage involving medusae or is medusoid in character, and an asexual reproduction stage, often colonial, involving asexual budding.
A prominent McMurdo hydroid is *Ectopleura crocea* [5,6,11]. *Ectopleura crocea* is colonial, with a few to several hundred mostly smooth stems arising from a mat [9]. *E. crocea* is found at depths from 0 to 234 meters and has been collected up to 12-17 centimeters in length [6,7,8,9,11]. *E. crocea* has white or greenish stems, orange red hydranth and gonophores, and white tentacles [9,11]. *E. crocea* can form creeping colonies on stones [10]. *E. crocea* has a diet dependent on the water column, capturing planktonic prey like copepods and invertebrate eggs [10].

**Taxonomic Note:** *Tubularia hodgsoni* was synonymized into *Tubularia ralphi*, and *T. ralphi* was synonymized into *Ectopleura crocea* [6,11].

The Antarctic scallop *Adamussium colbecki* may be colonized on either shell by small hydroids *Hydractinia angusta* [1,3]. *Hydractinia angusta* hydroids eat tube feet and pedicellariae of sea urchins including *Stereochinus neumayeri*, which grazes on the algal film growing on the surface of the scallop's shell, but is not a predator of the scallop [1]. *A. colbecki* shells are very thin and such urchin grazing may damage the shell; thus the hydroids act in defense of the scallop [1]. *Hydractinia angusta* hydroids eat the film (includes agglutinated diatoms) it can remove with its tentacles from the scallop shell, as well as bottom sediment exposed to it due to clapping activity of the scallop [1].

*Hydractinia angusta* hydroids also reduce the settling of young *Adamussium colbecki* scallop larvae onto the shells of adult scallops, competing successfully for shell space with the young scallops [2].

a thecate hydroid *Hydrodendron arboreum*

*Hydrodendron arboreum* is found throughout Antarctica and Bouvet Island, Kerguelen Island, Marion and Prince Edward Islands, and Patagonia at depths from 18 to 558 meters [3,4,5,9,10,13,14].
Hydrodendron arboreum is found in shrubby woody colonies with thick fascicled stems and irregular branching in different planes, reaching up to 35 centimeters high [3,4,7,10,13,14].
*Hydrodendron arboreum* color is typically light greenish-brown or honey brown, with younger branches being pale yellowish to colorless [7,14].

The center of the colony may have a mass of sex cells with developing larvae, clustered on a specialized branch, that are 15-25 millimeters in diameter [6,10].
Hydrodendron arboreum is a conspicuous organism in Cape Armitage's third benthic faunal zone below 33 meters depth and is also found scattered around in the second benthic faunal zone between 15 and 33 meters depth [8].

Hydroids feed on plankton suspended in the water. During the Antarctic winter, it is dark for four months and plankton is greatly reduced though still present during that period; Antarctic suspension feeders may continue to feed at a low level or suspend their feeding activity for a few months centered on July [2].
Several *Doto antarctica* nudibranchs are shown here on *Hydrodendron arboreum*.

*Hydrodendron arboreum* is preyed upon by the seastar *Odontaster validus*, the nudibranch *Doto antarctica*, and two unidentified aeolid nudibranchs (possibly *Eubranchus* sp. and *Coryphella* sp.) [1].

**Taxonomic Note:** Genus was *Halecium arboreum* in 1966 [3], then changed to *Hydrodendron arborea* in 1977 [4], followed by a change to *Ophioides arboreus* in 1979 [5]. Several subsequent authors continued using the *Hydrodendron* genus and *Hydrodendron arboreum* [6,10,11,12,13]. Reassigned to *Hydrodendron arboreum* in 2008 [14].