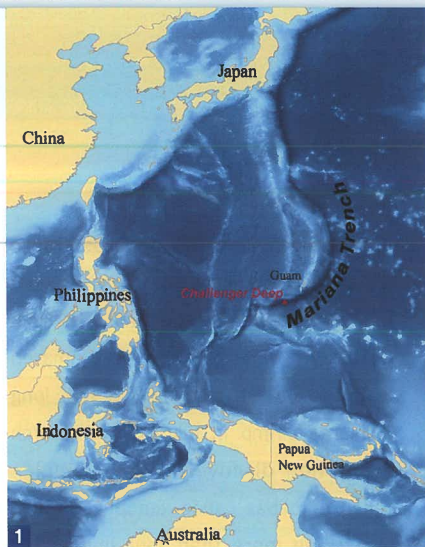


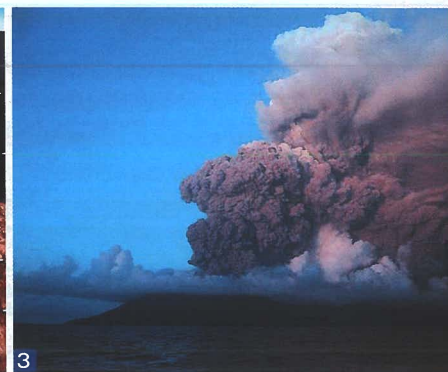
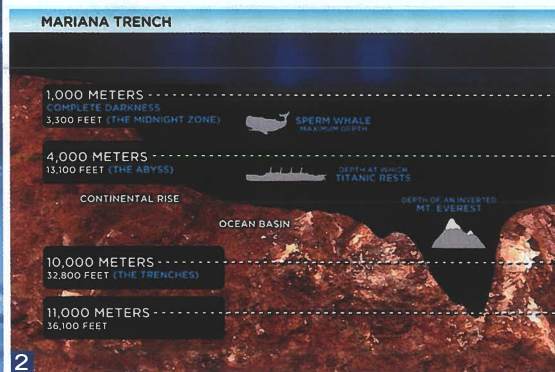


From the Deepest Ocean to the Tallest Mountain in the World

Story by Cindy Hanson



1/ Map of Mariana Trench 2/ The depth of Mariana Trench 3/ Anatahan_volcano in 2003
 1/ マリアナ海溝を示す地図 2/ マリアナ海溝の深さ 3/ 2003年のアナタハン島の噴火
 1/ 마리아나 해구를 표시한 지도 2/ 마리아나 해구의 깊이 3/ 2003년 아나타한 섬의 분화



Guam is the largest island of the Mariana Island chain. There are fourteen islands in all, forming an arc, or archipelago, with Guam at the bottom. Once upon a time, several were inhabited but today only Guam and the three major islands of the Northern Mariana Islands are populated. This is largely due to volcanic activity in the northernmost islands, like Anatahan which is constantly smoking and had a major eruption in 2003.

The islands are part of a submerged mountain range that rises from the edge of the Pacific tectonic plate and extends from Guam to near Japan. The Marianas are part of the notorious Ring of Fire, a horseshoe shaped region in the Pacific Ocean known for earthquakes and volcanoes due to the shifting tectonic plates in the Earth's surface. The Pacific Plate moves westward, below the Mariana Plate, forming the Marianas Trench.

The Marianas Trench is the deepest part of the Earth's crust. The depth has been measured at 36,070 feet (10,994 meters), making it the deepest ocean in the world. Guam is the closest island

to what is called Challenger's Deep, the deepest part of the Marianas Trench. During deep sea surveys of the trench conducted by the Hawaii Mapping Research Group from the Hawaii Institute of Geophysics and Planetology between 1997 and 2001, scientists discovered an area potentially deeper than Challenger's Deep. It is called the HMRG Deep, also closest to Guam.

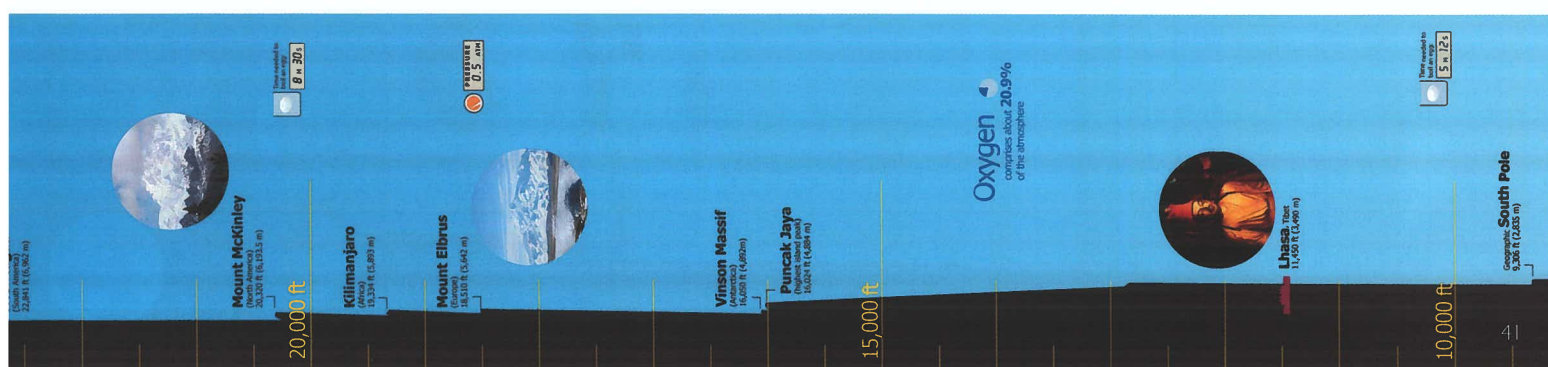
We enjoy the fact that we have the deepest ocean in the world, but thanks to the Marianas Trench, Guam also has the tallest mountain in the world. The tallest mountain in the world, above sea level, is Mount Everest in Nepal/China at 29,029 feet. If you could put Mt. Everest in the Marianas Trench, it would be under 7,041 feet of water. In most recorded histories, Mauna Kea is considered the tallest mountain in the world as most of it is underwater. From the sea floor, Mauna Kea is 33,500 feet tall. Although, much taller than Everest, Mauna Kea would still be covered by 2,570 feet of water if it was placed in the Marianas Trench.

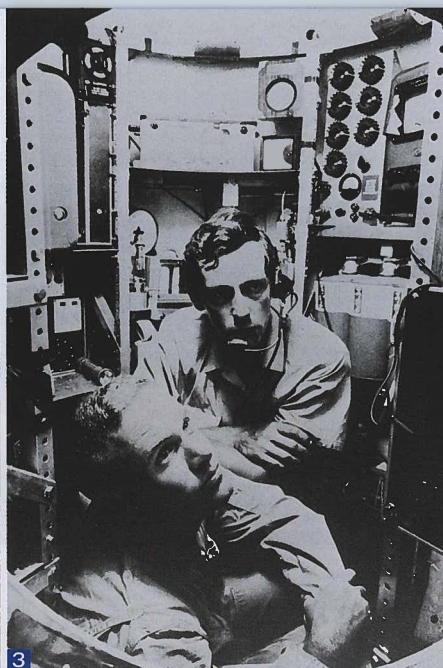
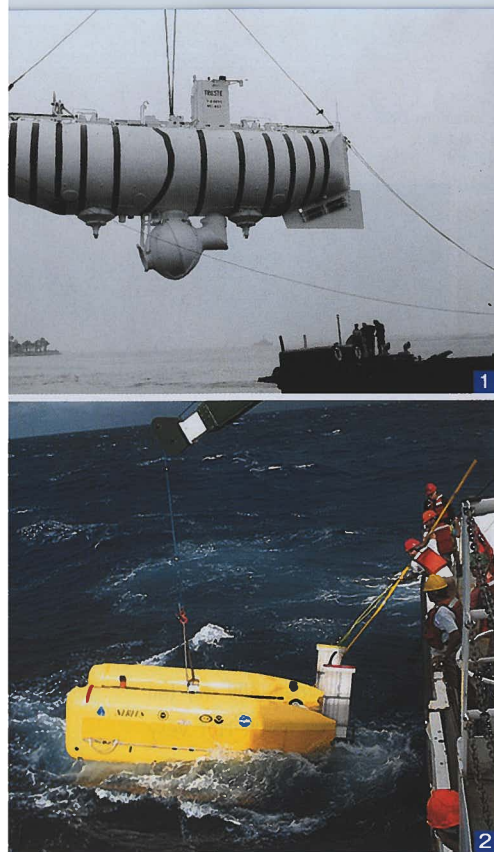
Then, there is Guam's Mount Lamlam. Located in the south, across from

the beautiful Cetti Bay lookout, Mt. Lamlam is only 1,342 feet (409 m.) tall when measured at sea level. Not very impressive, but Mt. Lamlam is the peak of a submerged mountain that extends in to the sea and the Marianas Trench. That would make the height of Mt. Lamlam much greater than Mauna Kea. The recorded height of Mt. Lamlam is officially 37,820 feet, making it the tallest mountain in the world from below sea level because of the Marianas Trench.

There have been many excursions to explore the bottom of the Marianas Trench, a difficult feat due to the extreme pressure. The very first exploration took place in 1875 using a weighted rope. The Challenger Expedition recorded a depth of 26,850 feet (8,184 m.). In 1951, using sounding equipment and drag lines, the Challenger II discovered the trench's deepest part, the Challenger Deep.

The first manned expedition was in 1960. Using a US Navy "deep boat" called the Bathyscaphe Trieste, US Navy Lt. Don Walsh and scientist Jacques Piccard dove the Marianas Trench and reached a depth of 35,814 feet. Unmanned ROVs





1/ Expedition by the Bathyscaphe Trieste in 1960 2/ ROVs Nereus used in exploration of 2009 3/ US Navy Lt. Don Walsh and scientist Jacques Piccard 1/1960年のトリエステ号による調査 2/2009年に使用されたハイブリッド式無人探査機「ネーレウス」 3/初の有人調査に参加したドン・ウォルシュ氏とジャック・ピカード氏 1/1960年トリエステ号が実施した調査 2/2009年に使用されたハイブリッド式無人探査機「ネーレウス」 3/ 처음으로 사람이 직접 실시하는 조사에 참가한 돈 월시와 자크 피카르

(remotely operated vehicle) named the Kaiko in 1996 and the Nereus in 2009 were the next expeditions to the depths of the Marianas Trench, again reaching 35,814 feet.

The most famous descent and first to reach the bottom of the Marianas Trench occurred on March 26, 2012. Canadian film director, James Cameron, famous for movies like the Terminator series, Rambo, The Abyss, Titanic, and Avatar, fulfilled a dream by becoming the first person to reach to make a solo trip to the bottom of Challenger Deep. It took Cameron two hours and 36 minutes to reach the bottom in a deep-submergence vehicle named the DVS Challenger Deepsea.

Cameron spent three hours exploring and discovered several new species of sea cucumber, squid worm, and a giant

single-cell amoeba. The filmmaker made a three-hour 3D movie of his adventure called Deepsea Challenge 3D. You can see the trailer at his website www.deepseachallenge.com. He donated the DVS Challenger Deepsea to the Woods Hole Oceanographic Institution.

In 2009, President George W. Bush deemed 95,216 square miles of submerged lands and water in the Mariana Archipelago a protected marine preserve called the Marianas Trench Marine National Monument. The region is now protected under US federal law, but sadly does not include the area where Challenger Deep is located. Dives to this area of the Marianas Trench have uncovered evidence of pollution, including an empty can of Spam – one of Guam's favorite products but not a good thing to

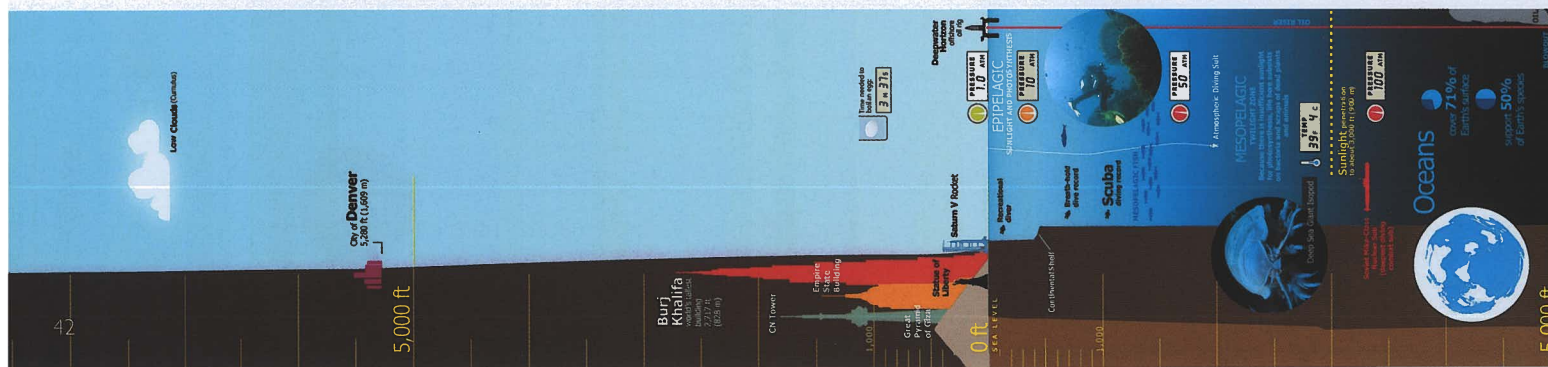
find in the ocean.

The creatures of the Marianas Trench are unique in their ability to thrive under the tremendous pressure found at such depths. In 1960, explorers were amazed to find a flatfish measuring a foot long and large shrimp. In July 2011, a research expedition discovered giant single-celled amoebas called xenophyophores, measuring more than four inches (10 cm) in length. The most common sealife in the Marianas Trench are the amoeba, amphipods (shrimp-like creatures), and small sea cucumbers.

There are fish at the bottom of the trench. The spookfish is an odd looking fish with a black body and transparent head. It moves slowly in the water, but darts quickly upward when it smells prey through its large nostrils. Dumbo octopus, named because they resemble the flying Disney character, are also found in the trench. These cute octopus can grow as large as six feet and are the only kind of their species that eat their prey whole.

The Marianas Trench is a dark place with no light. You would expect to find scary creatures and the goblin or vampire shark fits the bill. They're known as living fossils because they've been around for millions of years and have not changed much since the age of the dinosaur. When they're hunting for food, their entire jaw of scary protruding teeth jut out from their mouths to ensnare their meal. They have been documented as large as ten feet in length, but scientists predict they could grow larger.

In December 2014, a new species of snailfish, or ghost fish, was captured on



video at a depth of 26,722 feet (8,145 m.) At six inches long, this discovery broke the previous record for the largest deep sea fish every captured-on video. The footage also recorded new species of huge amphipods called supergiants. Crustaceans tend to grow larger in the deeper sea.

What other mysteries lie beneath the sea in the depths of the Marianas Trench, waiting to be discovered. Unmanned expeditions have taken place since James Cameron's historic solo excursion to Challenger Deep. In the summer of 2016, the NOAA Ship Okeanos Explorer spent several months making expeditions to the Marianas Trench to explore the seafloor and learn about its deep sea inhabitants.

The Marianas Trench is a place of mystery and allure. It is another reason Guam is such an exciting place to visit. After all, visiting Guam means you can climb the world's tallest mountain and swim in its deepest ocean all on the same day, thanks to the Marianas Trench!

広い太平洋の西側で赤道以北に位置するミクロネシア。そのミクロネシア地域の北西部にあるのが、グアムを含む14の島々から成るマリアナ諸島です。マリアナ諸島は噴火や地震が頻繁に起こることで有名な環太平洋火山帯の一部で、北部のアナタハン島で起きた2003年の大規模噴火はまだ記憶に新しいところ。火山活動が活発なマリアナ諸島ではグアム島、サイパン島、ロタ島、テナン島以外は無人の島です。

そのマリアナ諸島のすぐ近くには地球上で最も深い海溝、マリアナ海溝があります。グアムや日本近海まで伸びる太平洋プレートがマリアナプレートに沈み込

むことで作られた海溝で「チャレンジャー海淵 (Challenger's Deep)」と呼ばれるマリアナ海溝最深处は水面下10,994m (36,070feet)。世界最標高のエベレスト山 (8,848m) を海溝底においても海面まで2,146m届かず、海洋底から測るとエベレスト山より高いとされるハワイ諸島のマウナケア山 (10,210m) でも783m届かないほど深い海淵です。その海淵に最も近いグアム島の南部には標高409mという小さなラムラム山がありますが、それはマリアナ海溝から伸びる山で海洋底から測るとなんと11,527m。エベレスト山やマウナケア山を抜いて世界最高峰の山となるのです。

マリアナ海溝という深海には昔から多くの人々が関心を持ち、さまざまな調査が行われました。初めて測深調査が行われたの

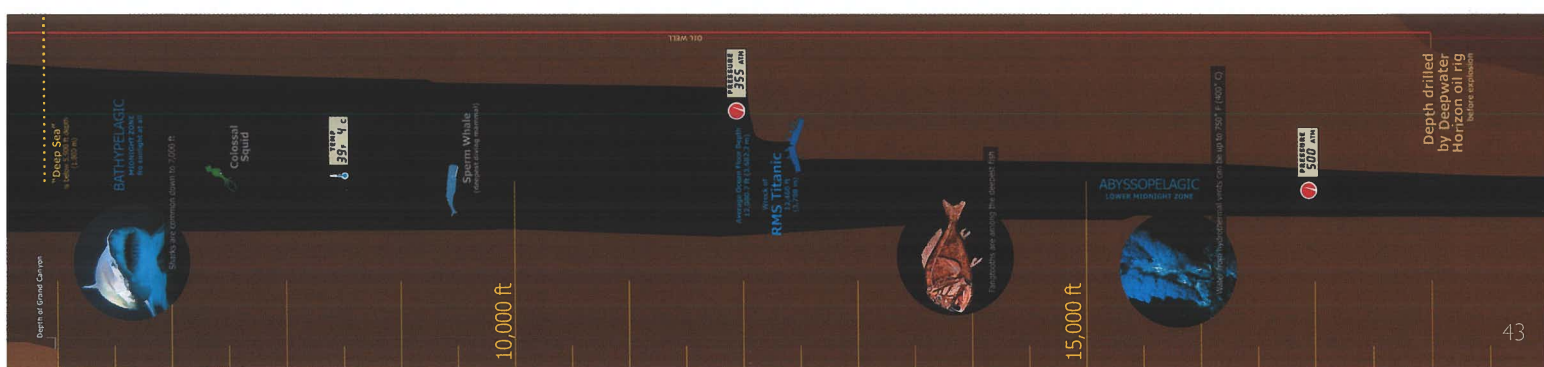
は1875年、イギリスのチャレンジャー号による重り付きのロープを使った調査で、測深8,184m(26,850feet)を記録。1951年、チャレンジャー 8号による本格的な音響測深では「チャレンジャー海淵」と名付けられた最深处の計測に成功しました。

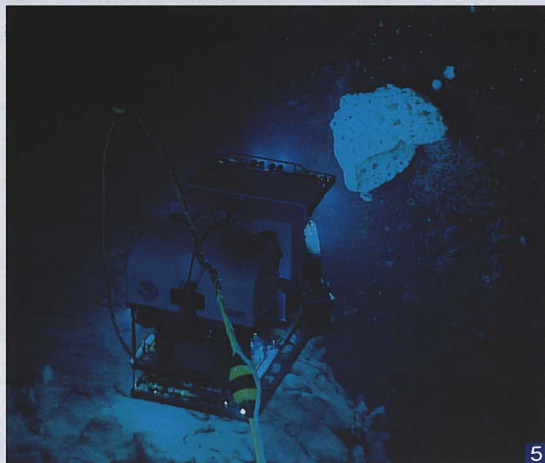
初の有人調査が行われたのは1960年。アメリカ海軍のドン・ウォルシュ (Don Walsh) 中尉とスイスの海洋学者ジャック・ピカル (Jacques Piccard) 氏が深海探査艇「トリエステ号」に乗り込み10,916m (35,814feet) の潜水に成功。1996年には日本の遠隔操作無人潜水機「かいこう」が、2009年にはハイブリッド式遠隔操作無人潜水機「ネーレウス」がチャレンジャー海淵に到達しています。

世界で初めて単独でチャレンジャー海淵



1,2/ First solo trip by DVS Challenger Deepsea Mr.James Cameron 3/ Canadian film director Mr.James Cameron 1,2/ ジェームス・キャメロン氏による DVS チャレンジャー・ディープシーでの調査 3/ 映画監督ジェームス・キャメロン氏 1,2/ 제임스 카메론이 DVS 챌린저 딥 씨로 실시한 조사 3/ 영화 감독 제임스 카메론 (Photos courtesy of Rolex)





1/ New hydromedusa as belonging to the genus *Crossota* discovered at a depth of ~3,700meters 2/ A huge blind lobster (possibly *Thausastocheles* sp.) 3/ Slit shell snail was a new observation for the Marianas and likely a new species 4/ A beautiful stalked crinoid, likely *Proisocrinus ruberrimus* 5/ ROV Deep Discoverer images a sponge that was over a meter across 1/ 深海 3,700m 付近で発見されたクロツタ属に属するヒドロクラゲの新種。真っ暗の深海で黄色や赤の美しく光りを放つ 2/ 目が退化したと思われる巨大ロブスター 3/ 新種と思われるマリアナ地域で初めて観察された巻貝 4/ 色鮮やかなウミウリ。植物のようだがヒトデやウニのような棘皮動物の一種 5/ マリアナトレンチの探査機と 1m を超す巨大海綿 1/ 深海 3,700m 付近で発見されたヘパリア科に属するヒドロクラゲの新種。暗黒の深海で黄色や赤の美しく光りを放つ 2/ 目が退化したと思われる巨大ロブスター 3/ 新種と思われるマリアナ地域で初めて観察された巻貝 4/ 色鮮やかなウミウリ。植物のようだがヒトデやウニのような棘皮動物の一種 5/ マリアナトレンチの探査機と 1m を超す巨大海綿

へ挑戦したのは、ターミネーター、ランボー、タイタニック、アバターなど数々の大ヒット作を生み出したカナダの映画監督ジェームス・キャメロン氏。2012年3月26日、一人乗り潜水艇「DVSチャレンジャー・ディープシー」で10,000mを超える深海へと挑み、2時間36分かけて海淵底に到達。そこに3時間滞在し、新種のナマコやスキッドワーム、大型アメーバなどを発見しました。その後、キャメロン氏は潜水艇をウッズホール海洋研究所 (WHOI) に寄付し、調査の様子はドキュメンタリー映画「ディープシー チャレンジ3D (Deepsea Challenge 3D)」に記録されました。(映画予告編を www.deepseachallenge.com から見るができます)

数々の調査から、強い水圧がかかる深海にもさまざまな生物が生息することがわ

かってきました。獲物の匂いがすると急激に突進するアカギンザメ、恐竜時代から生存し、生きた化石とも言われるほど長い歴史を刻んできたバンパイアシャーク (ミツクリザメ)、ディズニーキャラクターのダンボに似ていることから名付けられ1.8mまで成長することがあると言われるダンボタコ (オオクラゲダコ) の他、1960年の調査で発見された30cmほどのカレイや大型のエビ、2011年7月に発見された「クセノフィオフォラ」と呼ばれる10cmほどの巨大アメーバ、2014年2月には水深8,145mで約15cmのゴーストフィッシュ(クサウオ)や、スーパージャイアンツと呼ばれる大型に変化した甲殻類も映像に記録されました。

光りの届かない暗闇のマリアナ海溝には、まだ発見されていない数多くの生物が存在しています。昨年2016年夏にはNOAA (ア

メリカ海洋大気局) の調査船「オケアノス・エクスプローラー」が数か月にわたる大規模調査を行い、新種生物の発見と共に深海の最新映像を記録に留めました。

2009年、ジョージ・W・ブッシュ前アメリカ大統領が約8,900㎡に及ぶマリアナ海溝付近を「マリアナ海溝保護地区 (Marianas Trench Marine National Monument)」に認定しました。しかしそチャレンジャー海淵はそのエリアに含まれておらず、現在その周辺はゴミなどによって汚染されていることがわかっています。

人類がなかなか到達しえなかった神秘の世界に最も近くに位置するグアム島。この島に降り立ち世界一高いラムラム山を眺めると、今なお数多くの謎に包まれる未知の世界への探究心がこみ上げてきます。