Article

Entering the 'Door to Hell'

Natural gas fire earns a devilish nickname

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BY STUART THORNTON

Wednesday, July 16, 2014

Explorer and adventurer George Kourounis has had many memorable experiences in nature's extreme environments—chasing tornadoes across the American Midwest, swimming with piranhas in Venezuela, even getting married on a crater of an erupting volcano in the South Pacific. But a recent trek to remote Turkmenistan will always be one of his most exciting expeditions.

It was probably the only expedition where he admitted to feeling "a bit like a baked potato."

Kourounis was the first individual to descend into a 30-meter (100-foot) deep pit of fire known as the "Door to Hell." The Door to Hell is a crater in a large natural gas field that has been burning for decades. It is said that a Soviet oil rig fell into the crater in 1971, and a geologist decided to get rid of the rig by setting the pit on fire. The resulting gas-fed flames continue burning to this day.

Kourounis and his team were unable to verify the story behind the pit, but they definitely confirmed that the singular site exists.

The Canadian adventurer and former host of TV's *Angry Planet* had wanted to visit the Door to Hell for years.

"Every now and then, I would look at pictures on the Internet of the place again, and it just never exited my mind," Kourounis says. "It was there like a splinter in my brain that I couldn't get rid of."

Burning Challenges and Bureaucracy

One might think that rappelling into a burning pit would be the main challenge of this expedition, but Kourounis notes that his crew met another formidable obstacle earlier on.

"The biggest goal was just getting permission to get into the country," he says. "That was our biggest concern, because Turkmenistan is one of the most closed countries in the world."

The crew finally gained entry into Turkmenistan in 2013 after two years of trying to get into the country. Kourounis says the crater, which is about 76 meters (250 feet) wide, looks like a volcano in the middle of the desert.

"It is burning with a tremendous amount of flame like there is a lot of fire down there," he says. "Day or night, it is clearly burning. You can hear the roar of the fire if you stand at the edge. The heat if you are downwind of it is unbearable. There are thousands of little flames all around the edges and towards the center. Then there are two large flames in the middle at the bottom, and that is probably where the drilling rig hole was for the natural gas extraction."

Before rappelling into the burning pit, Kourounis says he got his equipment in order. This included a custom-made climbing harness made out of Kevlar, a self-contained breathing apparatus (similar to scuba gear), fire-resistant ropes, and an otherworldly heat-resistant suit.

“They [the suits] look like aluminum foil and actually that makes sense because they are made from an aluminized fabric,” Kourounis says. “These suits are used by some firefighters as well as steel-mill workers and volcanologists, any occupation where you need to be close to intense heat. They reflect a lot of the radiant heat, but you still get pretty hot inside. I did feel a bit like a baked potato in there.”

Another very specialized piece of equipment that Kourounis brought to Turkmenistan was a heat probe designed by the engineers who build National Geographic’s Crittercams.

“It sort of looks like a sword,” Kourounis says. “It was able to transmit wirelessly back to the crater’s edge to a laptop. It could transmit the ambient temperature where I was as well as it had a long end on it that I could jam into the ground and get a reading of how hot the ground was.”

Entering the Door to Hell

Even after a few days of preparing, Kourounis says the idea of an actual descent into the Door to Hell was nerve-wracking.

“I can tell you, when you are standing on the edge of this gigantic crater filled with fire—it is intimidating,” he says.

Still, the adventurer did descend into the fiery hole.

“It wasn’t dark at all,” Kourounis says of the crater’s interior. “As a matter of fact, you are surrounded by flames, so every thing has this orange hue.”

Once on the floor of the pit, Kourounis embarked on the scientific core of the expedition.

“The most important part of the mission and the whole thrust behind this entire expedition was to take some samples of the soil at the bottom—sand, basically—and see if there is any extremophile bacteria living at the bottom that could give us clues to basically life in these extreme environments,” Kourounis says. “There are planets that have been discovered outside of our solar system that have a very hot, methane-rich environment kind of similar to what is in the crater. So, in essence, we were looking for alien life right here on Earth.”

“It’s a very volatile place,” Kourounis says of the Door to Hell. “To give you an example of how volatile, at one point I kneeled down on the ground, and I’m digging in the sand to try and gather some samples from a little below the surface and as I’m digging with a small hand shovel, fire is coming out of the hole that I’m digging. I just opened up a new vent as I’m digging down there!”

The soil samples were given to Dr. Stefan Green, the microbiologist on the expedition. Green says that a few kinds of bacteria were discovered in the soil from the crater floor. These extremophiles appear to be what Green calls “enriched” by the Door to Hell’s high temperature and low nutrient levels, among other things.

Along with this discovery of unexpected life in one of the Earth’s most inhospitable places, the Door to Hell has an out-of-this-world tinge to it, according to Kourounis.

“The orange glow from the flames makes the ground completely orange, and the walls of the crater look orange,” he says. “It really reminds me of being on a place like Mars, where you have that orange or red soil. It just has an other-Earthly feel.”

VOCABULARY

Term	Part of Speech	Definition
ambient	*adjective*	having to do with the surrounding area or environment

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bacteria	*plural noun*	(singular: bacterium) single-celled organisms found in every ecosystem on Earth.
biologist	*noun*	scientist who studies living organisms.
crater	*noun*	bowl-shaped depression formed by a volcanic eruption or impact of a meteorite.
Crittercam	*noun*	camera designed to be worn on a wild animal, providing a "critter-eye view" of the animal's environment.
descend	*verb*	to go from a higher to a lower place.
desert	*noun*	area of land that receives no more than 25 centimeters (10 inches) of precipitation a year.
engineer	*noun*	person who plans the building of things, such as structures (construction engineer) or substances (chemical engineer).
environment	*noun*	conditions that surround and influence an organism or community.
equipment	*noun*	tools and materials to perform a task or function.
erupt	*verb*	to explode or suddenly eject material.
expedition	*noun*	journey with a specific purpose, such as exploration.
explorer	*noun*	person who studies unknown areas.
extraction	*noun*	process by which natural resources are extracted and removed from the earth.
extremophile	*noun*	microbe that is able to survive in very harsh environments, such as freezing or boiling water.
fabric	*noun*	cloth.
formidable	*adjective*	intimidating, or causing fear or hesitation due to difficulty.
geologist	*noun*	person who studies the physical formations of the Earth.
gigantic	*adjective*	very large.
hue	*noun*	tint or general variety of color.
inhospitable	*adjective*	offering no shelter or favorable climate.
intimidating	*adjective*	frightening, overwhelming, or discouraging.
Kevlar	*noun*	brand of synthetic fiber noted for its strength and durability.
methane	*noun*	chemical compound that is the basic ingredient of natural gas.
Midwest	*noun*	area of the United States consisting of the following states: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
natural gas	*noun*	type of fossil fuel made up mostly of the gas methane.
nerve-wracking	*adjective*	exhausting or scary.
nutrient	*noun*	substance an organism needs for energy, growth, and life.
obstacle	*noun*	something that slows or stops progress.
oil rig	*noun*	complex series of machinery and systems used to drill for oil on land

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piranha	*noun*	carnivorous, freshwater fish native to South America. Also called caribe.
planet	*noun*	large, spherical celestial body that regularly rotates around a star.
probe	*noun*	thin instrument for exploring the depth or other qualities of a material.
rappel	*verb*	to descend a steep slope by means of a double rope secured above and placed around the body and let out gradually.
recent	*adjective*	new or happening lately.
remote	*adjective*	distant or far away.
scuba	*noun, adjective*	(self-contained underwater breathing apparatus) portable device for breathing underwater.
soil	*noun*	top layer of the Earth's surface where plants can grow.
solar system	*noun*	the sun and the planets, asteroids, comets, and other bodies that orbit around it.
Soviet	*adjective*	having to do with the Soviet Union and the areas it influenced.
specialize	*verb*	to study, work, or take an interest in one area of a larger field of ideas.
steel	*noun*	metal made of the elements iron and carbon.
temperature	*noun*	degree of hotness or coldness measured by a thermometer with a numerical scale.
tinge	*noun*	slight tint or color.
tornado	*noun*	a violently rotating column of air that forms at the bottom of a cloud and touches the ground.
transmit	*verb*	to pass along information or communicate.
trek	*noun*	journey, especially across difficult terrain.
tremendous	*adjective*	very large or important.
vent	*noun*	crack in the Earth's crust that spews hot gases and mineral-rich water.
verify	*verb*	to prove as true.
volatile	*adjective*	able to easily change from liquid to vapor.
volcano	*noun*	an opening in the Earth's crust, through which lava, ash, and gases erupt, and also the cone built by eruptions.
volcanologist	*noun*	scientist who studies volcanoes.

For Further Exploration

Articles & Profiles

- International Science Times: ‘Door To Hell’—Turkmenistan Crater Has Been On Fire For Over 40 Years

Images

- National Geographic Travel: Gas Crater, Turkmenistan

Websites

- George Kourounis