The Where of Mineral Names: Namibite, Namib Desert, Copper Valley, Khorixas District and Region, Namibia

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ABOUT THE COVER: *Color-zoned brown fluorite crystals on white bladed celestine, 4 cm tall, White Rock quarry, Clay Center, Ottawa County, Ohio. Don and Gloria Olson specimen, Jeff Scovil photo. See related article on fluorite from the Findlay Arch district, beginning on page 110.*

Namib Desert
Copper Valley, Khorixas District and Region, Namibia
NAMIBITE

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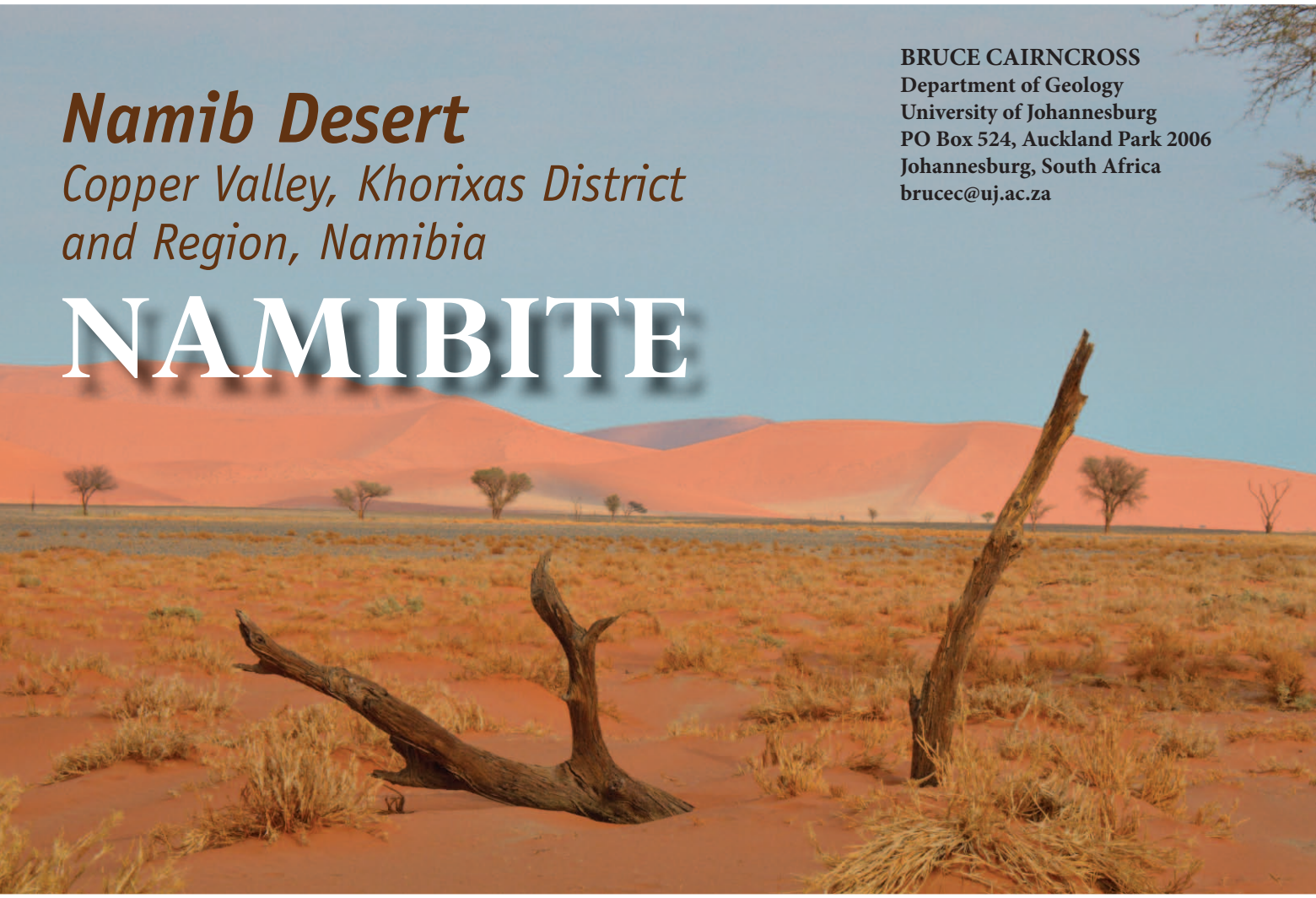

Figure 1. **The Namib Desert in the Sossusvlei area, Namibia. Bruce Cairncross photo (2017).**

NAMIBITE, $Cu(BiO)_2VO_4(OH)$, was discovered on the farm 504 Mesopotamia located in Copper Valley in northwestern Namibia (von Knorring and Sahama 1981) where it occurs in a polymetallic mineralized hydrothermal quartz vein (fig. 3). Subsequent to its description as a new species, its crystal structure and symmetry were revised by Kolitsch and Giester (2000). Namibite is found as small (less than 2-mm), translucent to transparent, olive-green to dark green crystals (fig. 2) with a pistachio-green streak (https://www.mindat.org/min-2836.html; accessed April 2017). It is triclinic-pseudomonoclinic (Kolitsch and Giester 2000), has good cleavage on {001}, and forms in various habits including platy crystals, radiating aggregates, and rounded masses (Anthony et al. 2000). Twinning is common on {011}. At the type locality, namibite is associated with beyerite, brochantite, khorixasite, and quartz. Since its discovery in Namibia, namibite has been found in other global localities (Dunning and Cooper 1998), and Mindat currently lists twenty-three known localities. The mineral is named after the Namib Desert (fig. 1).

Geology of Mesopotamia 504 Farm

Mesopotamia 504 farm is located in Copper Valley, approximately 65 kilometers northwest of Khorixas in Damaraland (fig. 3). Several small copper deposits occur in this region where copper-mineralized quartz veins intersect gneiss and schist of the 1.8 Ga Huab Complex (Schneider and Seeger 1992). The deposit was prospected prior to 1924, and from 1950 to 1952 open-cast mining produced more than 1,000 tons of ore with 20–30 percent copper. The main ore minerals are chalcocite and chalcopyrite (Schneider and Seeger 1992). However, there are a host of other minerals reported from the deposit including azurite, beyerite, bismuth,

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bismutite, chrysocolla, copper, cuprite, embolite, galena, iodagyrite, khorixasite, malachite, and scheelite (von Knorring and Sahama 1981; Niedermayr 2001; Niedermayr and Jahn 2006; von Bezing, Bode, and Jahn 2014). Most of these occur mainly as microminerals and were collected from old mine dumps.

The Namib Desert

The Namib Desert is believed to be the oldest desert in the world, having formed approximately 5 million years ago (Ma) (Mendelsohn et al. 2002). It comprises major aeolian dunes called the Namib Sand Sea (fig. 4) and the Namib gravel plains (fig. 5). The former is probably most well known from a tourist standpoint and is most prominent along the west coast of Namibia extending from Lüderitz to Walvis Bay. But the Namib Desert per se goes beyond the borders of Namibia, from north of its northern border, the Carunjamba River in southern Angola, to its southern extremity, south of its border, the Olifants River in the Republic of South Africa, forming approximately 2,000 kilometers of arid terrain (Schneider and van Schalkwyk 2016).

Ancient paleodunes predate the modern dune fields, and these older deposits have been dated at 43 Ma (Schneider and van Schalkwyk 2016). However, the Namib Desert formed approximately 15–16 Ma when arid conditions existed, but this was followed by wetter periods 7–12 Ma (Mendelsohn et al. 2002). With the establishment of the cold Benguela Current about 5 Ma, dry conditions have persisted, accounting for the longevity of the Namib Desert. The Benguela Current flows north along Namibia's Atlantic seaboard circulating cold south Atlantic water. Because the water is colder than the ambient air temperature above, no warm, moist air can rise and travel landward, hence the Namib Desert's aridity. A common feature along the coast is morning fog and mist that extends slightly inland because the small amount of uplift that does occur seldom rises high enough to form rain clouds, but rather cold fog close to the surface. Coastal rainfall is only 15 mm per annum; further inland the desert also receives little rain, less than 100 mm, hence the hyperarid environment. The prevailing wind direction is from the south, and this blows coastal sand landward that ultimately forms the sand sea.

Although the Namib Desert experiences one of the harshest climatic regimes, biodiversity is noteworthy, and Schneider and van Schalkwyk (2016) note that two hundred species of beetles and sixty species of reptiles are endemic to the Namib (fig. 6). In addition, wildlife and birds (fig. 7) are also present together with desert lions and elephants, which are perhaps the most famous, although several species of antelope, such as the oryx, have adapted to living in the harsh environment. Flora are also represented, perhaps the most noteworthy being *Welwitchia mirabilis* (fig. 8), a somewhat bizarre gymnosperm with separate male and female plants with only two leaves and lifespans of up to fif-

Figure 2. **Crystals of namibite scattered on quartz, Mesopotamia Copper Valley, Khorixas district, Namibia; field of view is 4 mm. Bruce Cairncross specimen and photo.**

Figure 3. **Locality map of the Namib Desert along the western seaboard of Namibia and parts of southern Angola and northern South Africa; prepared by William Besse.**

Figure 4. **LANDSAT satellite image of part of the Namib Desert. The white and gray strip extending into the dune field is Soussusvlei, an ephemeral salt-clay pan located in the Namib-Naukluft Park. Some of the dunes are over 300 meters high and are among the highest in the world. Source: https://earthobservatory.nasa.gov/IOTD/view.php?id=2804; accessed April 2017.**

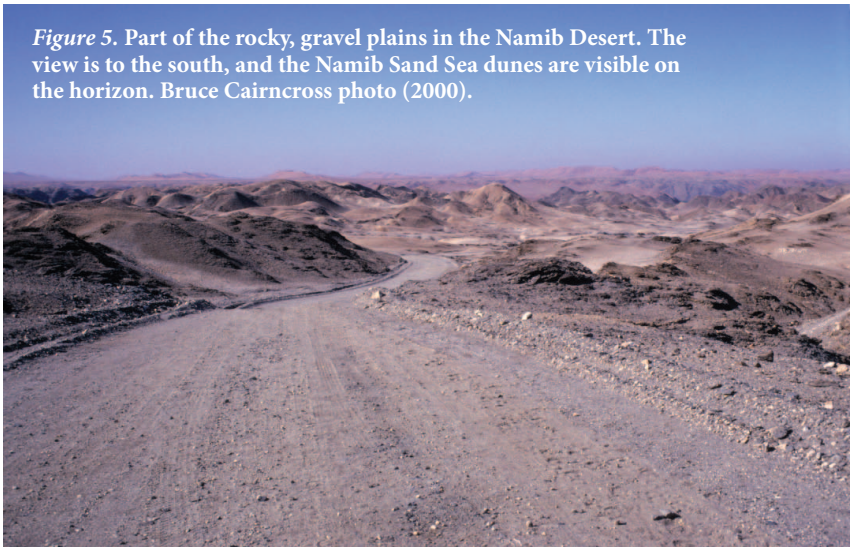

Figure 5. **Part of the rocky, gravel plains in the Namib Desert. The view is to the south, and the Namib Sand Sea dunes are visible on the horizon. Bruce Cairncross photo (2000).**

teen hundred years (https://www.plantzafrica.com/plantwxyz/welwitschia.htm; accessed April 2017). The desert edelweiss (*helichrysum roseo-niveum*) is another plant highly adapted to the hyper-arid Namib Desert (fig. 9).

From a mineralogical standpoint, there are many economic-deposit mineral localities that fall within the boundaries of the Namib Desert. The largest operating mine is the Rössing Uranium mine situated between Swakopmund and Usakos. Other deposits include copper (Gorob and Hope mines), Namib Lead mine, and a host of pegmatites. Most famous, although now economically unimportant, were diamond deposits that were mined in the coastal dunes in the Lüderitz district. Mineral collectors are familiar with specimens from Klein Spitzkoppe, Erongo, and Goboboseb that all fall within the desert regime.

Namibite might be a small, rare green mineral, but its name derivation honors one of the world's oldest and most diverse deserts that encapsulates a wide array of plant, animal, and insect life as well as many important economic mineral deposits.

Figure 6. **A lizard in the Namib Desert gravel plains. Bruce Cairncross photo (2014).**

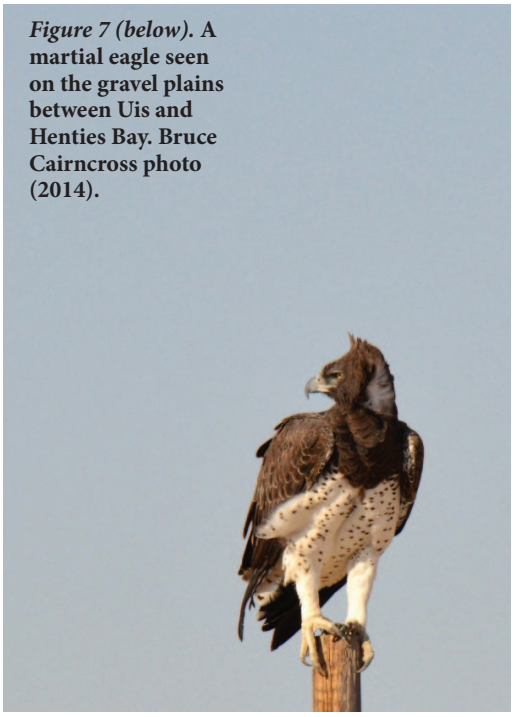

Figure 7 (below). **A martial eagle seen on the gravel plains between Uis and Henties Bay. Bruce Cairncross photo (2014).**

Figure 8. **A group of *Welwitchia mirabilis* growing in the rocky Namib Desert. The plant in the foreground is a female and measures approximately 3 meters. Each plant has only two leaves; these grow out from the central stem and die off at their edges as they are blown by the wind and abrade in the sand. Brandberg Mountain is in the background. Bruce Cairncross photo (2017).**

Figure 9. **A desert edelweiss in bloom growing in the dry Khan River close to Rössing Uranium mine. Bruce Cairncross photo (2014).**

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William Besse kindly drafted the locality map. Mark Jacobson reviewed the article and made valuable comments to improve its content. This article is based upon work partially supported financially by the National Research Foundation (NRF). Any opinions, findings and conclusions or recommendations expressed in this article are those of the author, and therefore the NRF does not accept liability in regard thereto.

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