42-gallon barrels). Precious and semiprecious stones were extracted in the following amounts: jade (12.76 million kilograms), rubies (397,711 kilograms), sapphires (1,059,559 kilograms) and spinel (417,441 kilograms). Metals were mined at constant levels since 2006, among them manganese (160,000 metric tons), lead (11,700 metric tons), copper (25,000 metric tons) and zinc (5,000 metric tons) (Fong-Sam 2016, Chhibber 1934b). Among Myanmar’s total trade in 2013, which was at $18.05 billion (exports totalled $8.98 billion), natural gas exports accounted for $3.67 billion (equalling 40.8% of total exports), while the exports of base metals and ores were estimated at $92.0 million (Fong-Sam 2016). Main export partners were Thailand, China, India and Japan.

FUEL MINERALS

Fuel minerals, mainly oil and natural gas fields, can be found in the sedimentary basins which cover approximately three quarters of the territory (for the following: ESCAP 1996: 58-73). The Myanmar Tertiary geosyncline with an area of about 140,000 square (km2) is the main oil and natural gas potential region where offshore and onshore drilling has been extended since decades. Since pre-colonial times, oil seepages have been known in the Rakhine Coastal Basin (e.g. Ramree and Cheduba islands). The largest offshore fields – Shwe, Yadana, Zawtika and Yetagun – are internationally connected for export. Oil from the Yadana field contributes to the increasing amount of gas for local consumption in Yangon, moreover it is connected to two power plants in Bangkok; the main operators are the France-based Total E&P Myanmar (31.24%), the US-based Chevron Corp. (28.3%), the Thailand-based PTTEP (25.5%) and MOGE (15%) (Fong-Sam 2012). In 2013, the 794 km long Kyaukphyu Kunming gas and oil pipeline was completed to transport natural gas to Yunnan Province/China; a parallel pipeline measuring 771 km in length is under construction to transport crude oil from the Middle East (Fong-Sam 2016). The domestic pipeline links the largest onshore oil and natural gas fields of Ayadaw, Chauk, Htaukshabin and Yenangyaung. Numerous major and minor coal deposits ranging from Mesozoic to Tertiary age have been surveyed, the Kalewa and south-western Shan mountain basins currently being the largest exploitation areas. Tertiary coals are usually of the lignite type with low calorific power due to high percentages of moisture and volatile constituents.
METALLIC MINERALS

The country’s rich metallic minerals are mostly concentrated in the Eastern Highland Ranges. Iron ore deposits have been found near Hpakant, Myitkyina, in Northern Shan State, the area around Taunggyi and numerous, yet hardly explored areas in Shan State. Chromium and nickel are mainly found in Rakhine Yoma and western Kachin State, manganese in western Shan State and tungsten predominantly in western Shan State and the Tanintharyi Region. Copper mines are located in central Myanmar, among them large mines such as the Letpadaung mine in Sagaing Region, and many in the Eastern Highland Ranges. Tin and tungsten are mainly mined in the southern highlands as part of the tin/tungsten belt which runs from the tin islands of Banka and Bilitung (Indonesia) via the Malayan peninsula to the area around Loikaw and south of Nay Pyi Taw, then further as far as China. Tin placers are found in eluvial, colluvial, fluviatile and lacustrine sediments and also as near-shore marine tin placers offshore of the Tanintharyi coasts (ESCAP 1996: 98).

PRECIOUS METALS AND GEMSTONES

Precious metals, most of all gold, can be found in many locations, mostly in the inner-Myanmar tertiary basin near Monywa and in the Sino-Myanmar Ranges (e.g. Kyaunkpahto and Kyaunkpazat gold projects). Among the most well-known are the Mogok and Hpakanr areas. Jade is predominantly mined in and around Hpakanr, amber is found mostly in Hukawng valley. Numerous mining sites are located in the surroundings of Mogok, among them Ywa Thar Yar, Chaung Gyi, Kyauk Pya That and Pyaung Gaung (Keller 1983, Kane/Kammerling 1992, Lucas/Pardieu 2014, Kraas 2016c).

The most valuable gemstones here are members of the corundum group (the red variety is referred to as ruby; other colours are referred to as sapphires; Harlow/Bender 2013, HponePhyo Kan-Nyunt et al. 2013). In Mogok, numerous other precious and semi-precious stones and metals can be found, such as apatite, amethyst, red- and orange-coloured spinel, green peridot, lapis lazuli, garnet, moonstone, garnet, topaz, tourmaline, zircon, peridot, chrysoberyl or gem beryl, and gold. There are also several extremely rare minerals, such as the predominantly brown-dark violet painite, the black-brown hibonite, the pink pouudretteite, the predominately violet taafeite (Thanong et al. 2014), the yellowish monazite, the black columbite, the black tantalite or the titanite.