Preface

From 1960 to 1990 Northern Europe, especially south west Norway and Sweden, suffered from “Acid Rain”. sulfur dioxide emissions from combustion of coal and oil on the European continent and the British Isles were dissolved in clouds forming sulfuric acid that hit also the Nordic countries, having bedrock and soils of low base mineral content. The consequences were devastating; crayfish in lakes in barren districts were close to complete extinction, trees in the forest were damaged, and well waters became acidic. Nutrient minerals like calcium and magnesium were washed out from soils, when pH values drastically fell as the alkalinity (HCO$_3^-$) dropped, while concentrations of aluminum and other toxic elements increased. The acidic well water dissolved copper from pipes, and the intestinal bacterial flora was damaged, causing diarrhea to infants fed on formula prepared on the water. The environment had lost its Mineral Balance, as nutrient elements had decreased and toxic elements increased.

In 2010 drinking water scientists and practitioners from different countries of the world gathered on a conference in Kristianstad, Sweden. About 20 participants decided to write a monograph on the importance of minerals and mineral balance in drinking water. Ten proceeded and fulfilled the project.

This monograph is intended as course literature at the university level in different educations; environmental sciences, health protection, medical education, hydrology, hydrogeology, medical geology, and drinking water engineering/production. In addition, the monograph is a good guide for private and public drinking water producers on how to preserve or improve the mineral content and mineral balance of specific drinking waters. It is also a valuable guide for the public in understanding and evaluating the health significance of specific tap or bottled waters, since health bringing ranges of elements and element ratios are presented.

The first chapter is a historic introduction to minerals from drinking water, followed by a comparison of minerals from drinking water with the daily intake. The following three Chaps., 3, 4 and 5, give a summary of in total 42 nutrient and toxic minerals in water, and their influence on the human body and health. In Chap. 6 the mineral content and mineral balance in non-corrosive water is presented as well
as effects of different water treatments on mineral content and balance. Potential health effects of demineralized water, and the importance of mineral balance in drinking water is mirrored in Chaps. 7 and 8. Optimal concentration ranges and element ratios are presented. Future drinking water regulations are suggested in the last chapter, number 9. Ions are in general presented without charges, and may also appear in water as complex ions.

Stockholm, Sweden

Ingegerd Rosborg
Drinking Water Minerals and Mineral Balance
Importance, Health Significance, Safety Precautions
Rosborg, I. (Ed.)
2015, XIX, 140 p. 26 illus., 23 illus. in color., Hardcover
ISBN: 978-3-319-09592-9