

# Contents

<b>1</b>	<b>Omnipresent Soils .....</b>	<b>1</b>
<b>2</b>	<b>How I Earned My First Crown and Dollar .....</b>	<b>7</b>
2.1	The Story of the Author Kutflek.....	7
2.2	The Story of the Author Nielsen .....	9
<b>3</b>	<b>Soil Is the Skin of the Planet Earth .....</b>	<b>13</b>
<b>4</b>	<b>The Smallest Zoo and Botanical Microgardens .....</b>	<b>21</b>
4.1	Viruses.....	22
4.2	Bacteria .....	22
4.3	Soil Fungi.....	25
4.4	Soil Enzymes.....	26
4.5	Algae .....	27
4.6	Zooedaphon.....	27
4.7	Soil as a Microgarden?.....	30
<b>5</b>	<b>The Birth of Soils .....</b>	<b>31</b>
5.1	Rocks' Weathering .....	35
5.1.1	Physical Weathering .....	36
5.1.2	Chemical Weathering .....	39
5.2	The Old and New Minerals .....	46
5.2.1	Size of Soil Particles.....	46
5.2.2	The Finest Minerals.....	48
5.2.3	Soil's First Name: Texture.....	57
5.3	Why the Topsoil Is Black or Gray Brown .....	62
5.3.1	Soil Humus .....	62
5.3.2	Humification.....	63
5.3.3	Humic Substances .....	66
<b>6</b>	<b>Crumbling of Soils .....</b>	<b>71</b>
6.1	Soil Structure.....	71
6.2	Magic of Soil Aggregation .....	74

<b>7</b>	<b>Soils as the Skyscrapers .....</b>	79
7.1	Soil Pores .....	79
7.2	Soil Porosity .....	83
7.3	Soil Pores Like a City Center.....	85
7.4	Carnival in Soil Pores.....	89
7.5	Specific Surface of the Soil on the Farmer's Field.....	94
7.6	A Carnival with Change of Masks Again?.....	97
7.7	Inhabitants of Soil Pores .....	99
<b>8</b>	<b>Soil Is Never Without Water .....</b>	101
8.1	Methods of Measuring Soil Water Content.....	102
8.2	How Water Is Kept in Soil Pores.....	107
8.3	Does the Soil Like Its Water Every Time? .....	114
8.4	From Capillary Tubes to Real Soil Pores Partly Filled by Water.....	115
<b>9</b>	<b>How Water Flows in Soil .....</b>	119
9.1	The First Observations .....	119
9.2	Flow of Water in Saturated and Unsaturated Soils.....	120
9.2.1	Saturated Flow.....	122
9.2.2	Unsaturated Flow .....	129
<b>10</b>	<b>Soil Regulates Circulation of Water on the Planet Earth.....</b>	137
10.1	Infiltration of Water into Soil .....	138
10.1.1	Infiltration from the Suddenly Flooded Soil .....	139
10.1.2	Rain Infiltration .....	140
10.2	What Happens After Infiltration (About Soil Water Redistribution) .....	145
10.3	Soil Water Evaporation and Evapotranspiration .....	147
10.3.1	Evaporation .....	147
10.3.2	Transpiration.....	151
10.3.3	Wilting Point .....	156
<b>11</b>	<b>How the Plants Nourish Themselves .....</b>	159
11.1	Photosynthesis.....	160
11.2	Plants' Pantry.....	163
11.3	Plants' Needs for Individual Nutrients .....	165
<b>12</b>	<b>Soil Reveals Its True Character .....</b>	171
12.1	What the Soil's Face Says .....	171
12.2	Soil Horizons.....	173
12.3	A Long and Prickly Start of Predecessors of Soil Science .....	177
12.4	Pedological Darwin .....	181
12.5	Everlasting Stimulus from Dokuchaev .....	183

<b>13 Dear Soil, What Is Your Name? .....</b>	<b>187</b>
13.1 World Reference Base (WRB) .....	188
13.2 USDA Soil Taxonomy.....	203
13.3 Granny Soils.....	212
13.4 Maps of the Soil Distribution .....	219
<b>14 Illness and Death of Soils.....</b>	<b>221</b>
14.1 Can the Soil Be Ill? .....	221
14.2 The Death of Soils.....	226
14.3 How to Keep the Soil Healthy.....	229
<b>Index.....</b>	<b>233</b>