

INDEX OF PLANTS

The symbols after the plant-names represent the elements referred to on the pages indicated.

- Acorus calamus Mn 84
- Actinostrobus pyramidalis Mn 86
- Aesculus Mn 84
- Agathis robusta Mn 86
- Ageratum Zn 42
- Alder As 53
- Alfalfa Mn 87
- Algae Cu 35; As 61; B 66, 82, 83
- Alnus incana Mn 84
- Aloe Cu 26
- Alsike clover Mn 87
- Amomum spp. (Paradieskörner) Cu 15
- Ampelopsis Cu 32; Zn 47
- Anabena Cu 35
- Angiosperms B 66
- Anthracnose B 82
- Apple B 65; Mn 102
- Apricot Cu 16
- Araucaria bidwillii Mn 86
- cunninghamii Mn 86
- Armeria sp. Zn 38
- vulgaris Zn 36
- Arundo sacchar Mn 84
- Asparagus Mn 85
- Aspergillus Cu 33, 34
- fumigatus Mn 100
- glaucum (=Penicillium glaucum) As 63
- niger (=Sterigmatocystis nigra) Cu 34;
- Zn 48, 49, 50; As 63; B 82; Mn 100
- Athrotaxis selaginoides Mn 86
- Azotobacter chrococcum B 82
- Barley 4, 8, 11, 13; Cu 16, 17, 18, 20, 28, 29; Zn 37, 39, 40, 43, 46, 47; As 52, 54, 55, 57, 60; B 66, 69, 74, 76, 78, 88; Mn 85, 88, 89, 91, 92, 93, 94, 95, 98, 101, 103, 106
- Beans 5, 13; Cu 16, 17, 22, 26, 28, 29; Zn 43, 47; As 58; B 69, 73, 77, 78; Mn 93, 106
- Beech Mn 85
- Beetroot (*Beta vulgaris*) Cu 16, 22, 26; Zn 37, 39; Mn 84, 85
- Beet, sugar As 61; B 65; Mn 99
- Birch (*Betula alba*) B 66; Mn 85
- Botrytis cinerea Mn 100
- Brassica oleracea Mn 84
- Buckwheat 11; Cu 16, 17, 29; As 53 (see *Polygonum fagopyrum*)
- Cabbage Sr 4; As 51, 52; Mn 96
- Cacao Cu 16
- Callitris gracilis Mn 86
- Callitris robusta Mn 86
- Cannabis B 74
- sativa B 66
- Capsella bursa-pastoris Zn 37
- Cardamomum minus Cu 15
- Carrot Mn 85
- Cauliflower Cu 31; Mn 84
- Centaurea cyanus Mn 87
- Chara Zn 46
- Charlock Cu 30
- Cherry B 65
- Chestnut Ca 71; Mn 85, 102
- Chickpea Cu 16; B 66
- Chicory Mn 85
- Chrysanthemum B 66
- Clover Cu 32; Zn 42, 43; As 61; Mn 93, 106
- crimson B 78
- lesser B 78
- red B 78
- white B 78
- Colea Zn 42
- Collinsia B 74
- Colza B 76
- Coniferae Zn 38, 39; Mn 86
- Conium maculatum Mn 84
- Convolvulus sp. As 58
- Cotton B 73
- Couch grass Mn 91
- Cow pea Cu 18
- Cruciferae Mn 84 98
- Cryptomeria japonica Mn 97
- Cucumber (*Cucurbito pepo*) As 52, 58
- Curcuma longa Cu 15
- Currant Cu 31
- Dactyridium franklini Mn 86
- Dianthus caryophyllus Mn 85
- Elodea Zn 46
- canadensis Cu 32; Zn 48
- Eriophorum Mn 96
- Ferns B 66
- Fig Zn 42; B 65
- Fir Mn 86
- Flax Mn 84, 97, 98
- Fungi Zn 44, 50; As 64; B 66, 81, 83
- Geranium Zn 42
- Gramineae B 74; Mn 98
- Grasses Zn 39, 40, 42; As 58, 61
- Gymnosperms B 66; Mn 86

130

Index of Plants

- Haricot B 70, 74
 - green As 52
 - white Zn 37
- Hemp Sr 4
- Hop B 66
- Hordeum distichum* As 54
 - vulgare Zn 39 (*see Barley*)
- Hyacinth 5
- Iberis B 74
- Iris Cu 15
- Kohl-rabi Zn 46
- Laminaria saccharina* B 66
- Lamium album* Mn 87
- Leguminosae* B 74, 78, 83; Mn 84, 98
- Lemon Mn 103
- Lentil 5; Mn 85
- Lettuce Cu 28
- Lichen As 59
- Lilium lancefolium* Mn 88
- Linseed Cu 16, 17
- Linum* B 74
- Love apple B 65
- Lucerne B 78; Mn 85, 101
- Lupin* 5; Cu 17, 19, 22, 23; Zn 47; As 59
 - white B 67, 69
 - yellow B 70, 77
- Lupinus albus* Cu 19, 20, 22; Zn 45; B 68
 - (*see White lupin*)
- luteus Mn 87
- Maasa picta B 65
- Maize 5; Cu 16, 17, 19, 24, 26, 28; Zn 37, 43, 44, 47; As 53, 54, 60; B 67, 68, 69, 71, 72, 73, 76, 78; Mn 85, 88, 103
- Melon B 78
- Menyanthes trifoliata Cu 35
- Mildew B 82
- Molinia caerulea* Cu 16; Zn 37
- Mucor mucedo As 59, 63
- Mushroom B 66
- Mustard Cu 17, 24; Zn 46
- Nasturtium Cu 17
- Nicotiana rustica* Mn 88
- Nuphar lutea Cu 35
- Oak Zn 42
- Oat Cu 16, 17, 19, 22, 24, 28, 32; Zn 47; As 53; B 69, 71, 75; Mn 85, 90, 95, 96, 99
- Onion Zn 46; B 66; Mn 97
- Onobrychis sativa* Zn 39
- Orange Mn 103
- Oscillatoria* Cu 35
- Panicum italicum* Cu 26; As 58
- Pansy Zn 42
- Paprika Cu 16, 17
- Paradieskörner (*Amomum spp.*) Cu 15
- Pea 3, 4, 5, 11, 13, 104, 106; Cu 17, 22, 26, 28, 29, 30; Zn 40, 45, 46, 47; As 51, 54, 55, 56, 58; B 67, 69, 71, 74, 76, 77, 78, 83; Mn 85, 89, 93, 95, 96, 98, 106 (*see also Pisum sativum*)
 sweet Cu 17
- Peach Mn 102
- Pear Cu 16; B 65
- Pelargonium zonale* As 61
- Penicillium* Cu 33, 34
 - brevicaule As 63
 - cupricum Cu 34
 - glaucum Cu 23, 34; As 59, 63; Mn 100
- Phanerogams Mn 85
- Phaseolus* As 59
 - vulgaris Cu 17
- Phormidium valderianum* As 62
- Phyllocladus rhomboidalis* Mn 86
- Pine Mn 86
- Pineapple Mn 91, 92
- Pisum sativum* Cu 17, 18, 26, 27; Zn 41; As 58 (*see also Pea*)
- Plantago lanceolata* Zn 37
- Podocarpus elata* Mn 86
- Polygonum amphibium* Cu 35
 - aviculare Zn 37, 38
 - fagopyrum Cu 26; Zn 39, 41; As 54, 58 (*see Buckwheat*)
 - persecaria Cu 5; As 54
- Poplar Cu 15
- Potatoes Cu 16, 22, 24, 26, 27, 28, 30, 32; Zn 46; As 52, 63; B 73; Mn 84, 85, 99
- Protococcus infusionum* As 62
- Pyrus communis* Mn 84
- Quercus macrocarpa* Cu 15
- Radish Sr 4; B 75; Mn 93, 101
- Raphanus* B 74
 - sativus Zn 39
- Raspberry B 65
- Rice Cu 30; Zn 47; B 66, 74; Mn 85, 95, 96, 97, 103
- Rosa remontana* Mn 85
- Rubus* B 65
- Rye Cu 16; As 60; B 78
- Sainfoin Mn 85
- Salsify Zn 46
- Scarlet runner B 78
- Seaweed As 52
- Secale cereale* Cu 26; Zn 41; As 58
- Silene inflata* Zn 36, 37
- Solanum tuberosum* Mn 84
- Soy bean Cu 17, 19; Zn 47; B 67, 78; Mn 89, 93, 94
- Spergula arvensis* Zn 39
- Sphagnum Mn 96
- Spinach Zn 41; B 74; Mn 98, 103
- Spirogyra* Cu 35; As 62; B 82
- Sterigmatocystis nigra* Zn 48, 49 (*see Asper-gillus niger*)

Index of Plants

131

- Stichococcus bacillaris* As 62
Stock B 78
Sugar beet As 61; B 65; Mn 99
 cane B 65, 73; Mn 93
Sweet pea Cu 17
Taraxacum officinale Zn 37
Tea Mn 85
Thallophytes Mn 85
Thlaspi alpestre Zn 36
 sp. Zn 38
Timothy Zn 39
Tobacco As 52; B 66, 73
Tomato Mn 103
Trapa natans Mn 84
Trifolium pratense Zn 39
Triticum vulgare Cu 17; B 67 (*see Wheat*)
Tropaeolum lobbianum Cu 17, 18
Turnip As 51, 52; B 76
 swede Mn 84
Tussilago farfara Zn 37, 38
Ulothrix tenerrima As 62
Vaucheria B 82
Vetch Cu 24; Zn 42
Vicia faba Sr 4; Cu 27; B 77 (*see Broad Bean*)
 sativa Zn 39; B 67
Vine Cu 28, 30, 31
Viola sp. Zn 38
 tricolor Zn 36
Vitis vinifera As 52
Watercress B 66
Water melon B 65
Wheat 5; Cu 16, 17, 18, 23, 24, 25, 29,
30, 35; Zn 37, 42, 43, 44, 46, 47;
As 52, 60; B 66, 70, 74, 75, 78;
Mn 85, 87, 88, 90, 91, 92, 93, 95, 96,
99, 103
Willow Zn 39, 40
Yeast Zn 49; B 82; Mn 100
Zea japonica Cu 17, 18
 mays Cu 27 (*see Maize*)

GENERAL INDEX

- Absorption capacity of soils for copper 24
 - capacity of soils for zinc 41
 - of copper by roots 24
 - of poisons by plants 25
- Acceleration of protoplasmic streaming by zinc 46
- Accelerators 45
- Accumulation of copper in roots 24
 - of zinc in soil 43
- Action of heavy metals in mixed solutions 20
- Adsorption 8, 23
- Aeration in water culture 8
- Algae, assimilation of arsenic by 62
 - clearing ponds of 35
 - effect of arsenic on 62
 - effect of boron on 82
 - effect of copper on 35
- Aluminium 44, 84
 - oxide 84
- Arbutin 4
- Arsenate, potassium 53, 62
 - sodium 55, 56, 61
- Arsenates 53, 57
- Arsenic acid 53, 54, 60, 61, 62, 64
 - acid v. arsenious acid 53
 - acid v. phosphoric acid 53, 62
 - elimination of 59
 - gas liberated by moulds 63
 - in seaweeds 52
 - in soil, effect of 58
 - in superphosphate 58
 - trioxide in weed eradication 58
- Arsenious acid 53, 54, 57–61, 64
 - immunity of plants to 58
- Arsenite of lime 63
 - sodium 55, 56, 64
- Arsenites 53, 57
 - v. arsenates 57
- Artificial oxydases 92
 - "Artificial soils" 25, 46
- Assimilation, reduction in water plants 48
- Auto-oxidation 102
- Bacteroidal tissue 79, 80, 81
- Barium 44
- Borate, calcium 71
 - potassium 71
- Borates 74, 78
- Borax, 71, 74
 - in commercial fertilisers 72, 73
- Bordeaux mixture 30, 31
 - blocking of stomata by 33
 - effect on assimilation 33
- Boric acid 1, 65–83, 104
- Boro-mannitic acid 68
- Boron, antiseptic action 70
 - colour due to 76
- Boron, deficiency, signs of 77, 81
 - distribution in plants 66
 - effect of, on anatomy of plants 78, 79
 - effect of, on morphology of plants 77
 - necessary for broad beans, etc. 77
 - poisoning, indication of 68, 69
 - rôle in plant economy 76
- Cadmium 31, 49
- Caesium 87
- Calamine 37
 - plants 38
 - soils, flora of 37
- Calcium carbonate 4, 23, 25
 - chloride 20, 22, 59
 - sulphate 20, 44, 45
- Carbon black 23
 - dust 10
- Catalytic elements 49, 102
 - fertilisers 61, 102
 - function of manganese 102
- Chloral hydrate 22
- Chlorophyll 44, 60
- Chlorosis caused by manganese 90, 92
 - in absence of manganese 103
- Complementary manures 47, 102
- Conditions of plant life 7
- Copper 49
 - acetate 19
 - action on plant organs 30
 - bicarbonate 26
 - bromide 19
 - carbonate 35
 - carbonate, ammonium 31
 - chloride 19, 20
 - compounds, corrosive action on plant roots 5, 27
 - distribution in tissues 16
 - migration within plant 16
 - mode of action on plants 25
 - nitrate 19, 25
 - oxide 15, 25
 - phosphate 30
 - quantity in certain plants 16, 17
 - salts for weed eradication 30
 - salts, injection into plant tissues 31
 - sprays, effect on leaves 30, 32
 - sprays, fungicidal action of 35
 - sulphate 5, 19, 20–27, 29–35, 41
- Cumarin 4
- Distilled water, preparation of 10
- Double decomposition in soil 25
- Duration of experiments 13
- Enzymes 102, 103
- Experimental methods, comparison of 14

General Index

133

- Ferric chloride, sublimed 94
 - hydrate 23
- Ferrous sulphate 92
- Fungi, effect of arsenic on 62–64
 - effect of boron on 81
 - effect of copper on 33–35
 - effect of manganese on 100
 - effect of zinc on 48–50
- Fungicides, arsenical 63
- Galactose 82
- Germination, effect of arsenic on 60, 61
 - effect of boron on 73, 74
 - effect of copper on 27, 28
 - effect of manganese on 92, 93
 - effect of zinc on 43, 44
 - of grass seeds 61
 - of seeds in sawdust 11
 - of spores and pollen grains 28
- Glucinum 49
- Glucose 82
- Grading of seeds 11
- Growth in copper distilled water 17
 - of peas in water culture 11
- Gypsum 42
- Hydrochloric acid 22
- Hydrocyanic acid 4
- Hydrogen-ion concentration of solutions 13
- Hydroquinone 101
- Hypothesis of universal stimulation 104
- Improvement of crops by manganese 98, 99, 100
- Individuality of plants, error due to 13
- Interaction between soil and poison 9
- Intumescences on cauliflower leaves 31
- Iodine 2, 102
- Iron 31, 49
 - oxide 84
 - sesquioxide 92
 - sulphate 48, 89; 92, 94 (ferrous), 98 (ferric)
- Laccase 101, 105
- Lack of control over field experiments 9
- Lead 10, 26, 42, 44
- Lithium 87
- Magnesium chloride 20
 - sulphate 1
- Manganese and chlorophyll formation 102
 - as top dressing 97, 98
 - carbonate 91, 93, 96, 99
 - chloride 95, 97, 99
 - commercial value of 98
 - content of plants 88
 - cytological action of 88, 89
 - deposition in leaves 89
 - dioxide 92, 96, 99
 - essential to coniferae 86
 - in Australian soils 91
 - in organic combination 85
 - in sea water plants 87
- Manganese iodide 90, 91
 - manuring, after-effects of 97
 - nitrate 95
 - oxide 84, 85, 91, 92, 95, 97
 - phosphate 85, 90, 95
 - retardation of ripening by 89, 94
 - sulphate 88–100, 104
 - toxic to pineapples 91, 92
- Manganiferous soils in Hawaii 91
- Masking effect of inorganic food salts 4, 20
- Mercuric chloride 22
 - oxide 41
- Mercury 26
- Metallic oxides 84
- Methods, field experiments 9
 - sand cultures 8
 - soil cultures in pots 8
 - water cultures 7, 10–13
- Mode of entry of poisons into plants 4
- Nickel 50
- Nitrifying organisms 50
- Nitrogen fixation 79, 100
 - fixation by Azotobacter 82
- Nodules, nitrogen fixation 79
 - on broad bean, need of boron 78
 - on vetches 24
- Nucleinic combination 85
- Nutrient solutions, composition 13
- Oligodynamic action 28
- Over-mineralisation of plants 71
- Phenol 4
- Phosphoric acid 53, 54, 62, 64
- Photosynthesis, effect of copper on 32
- Presence of arsenic in animals 51
 - of arsenic in plants 51, 52
 - of boron in plants 65–67
 - of copper in plants 15–17
 - of manganese in plants 84–88
 - of zinc in plants 36–38
- Pyrogallol 101
- Raulin's solution 49
- Reproduction of poisoned plants 40
- Resorcinol 22
- Root, malformation due to poisoning 3
- Rubidium 87
- Silver nitrate 22
 - still 10
- Smut, prevention of, by copper compounds 28, 35
- Sodium chloride 20, 22, 44
 - hydroxide 22
 - nitrate 4
- Soil changes caused by zinc 42
- Species requiring boron 78
- Sterile cultures 25
- Stimulation by injection of copper solutions 31
 - by small doses of poisons 2
 - definition of 2

134

General Index

- Stimulation, local 47
 - of *Aspergillus niger* 50
 - of fungi by copper 34
 - of fungi by manganese 100
 - of mustard by zinc 46
 - of plants by arsenic 61
 - of plants by boron 74
 - of plants by copper (negative) 28
 - of plants by manganese 93
 - of plants by zinc 44
 - of respiration by zinc 43, 46
 - of rice by copper 30
 - physiological consideration of manganese 101
- Strontium nitrate 4
 - sulphate 4
- Sugar 22, 31, 48, 49, 68, 99, 100
- Sulphur, flowers of 10
- Thymol 22
- Toxic action, effect of light on 43
 - of arsenic 52
 - of boron 67
 - of copper 17
 - of manganese 88
 - of zinc 38
 - equivalent 18
 - limits of plant poisons, estimation of 26
- Toxicity of borax 72, 73
 - of nutrient salts 1
 - of organic compounds 4
 - of poisons, cause of 22
- Toxicity of positive ions in copper compounds 19, 22
 - reduction of 22, 39, 40
 - by carbon black and ferric hydrate 23
 - by insoluble substances 22
- Toxin and nutrient, distinction between 3
- Transmission of power of resistance 72
- Uranium 49
- Valency, effect on toxicity 44
- Vanillin 4
- Variation in results on different substrata 25
- Vitamins 103
- Weed eradication by arsenic 58, 64
 - by copper salts 30
- Zinc, absorption by roots 43
 - carbonate 37, 42, 43
 - chloride 43
 - effect of, on lower plants 48
 - effect of, on plant and soil 41
 - fixation of 49
 - mode of action on plants 43
 - needed by fungi, controversy 49, 50
 - nitrate 42
 - oxide 37, 42, 43, 47
 - oxide on leaves, deposition of 47
 - phosphate 42
 - sulphate 38–49
 - sulphide 42