

Preface or why such a book

Nature helps ... – of course – at first itself. All living organisms (bacteria, fungi, plants, and animals including prehistoric humans) had and still have to survive the struggle for life, since for millions of years they have been in competition with many individuals of their own species and with even higher numbers of competitors belonging to the rest of the living system, if they fit principally into the conditions given at a particular place on Earth.

This constant need to be always somewhat better / fitter than competitors was and is the motor of *evolution* that led and leads to unbelievable variations in body shape, astonishing physiological adaptations, and many other admirable abilities. Thus, thousands of skilful methods of defense against attacks from the surroundings have been developed. For example, toxic substances and repellents evolved that are used to keep predators away from engorging such individuals. Other species developed medical remedies, which support the wound-healing process or increase the success of reproduction respectively allows a faster growth rate under favorable conditions. Other compounds (e.g., inhibitors of freezing or “overheating”) helped survival in poor conditions such as icy winters or extreme heat. These facilities have been developed over millions of years and all species that had not been able to develop such facilities, are today no longer visible as they have returned to the general pool of molecules and elements on Earth. *Thus nature is cruel to all members* that are not flexible in the sense described above, and nature eliminates them for the sake of the survivors.

Of course nature *takes its steps slowly* by testing the chances and benefits of more or less occasional mutations of single individuals in a given biotope under changing environmental conditions.

It is not much longer than 100,000 years ago that humans were thrown as “last-minute man” (on the very late evening of the sixth day of creation) into the battle for survival on Earth. This sending to Earth was not only done by God saying “Go to Earth, rule it and produce successors,” but humans were also equipped with a small dose of the divine spirit of recognition – of course some received greater insight, while others received less of this spirit. In any case, the “gifted dwarfs”, i.e., humans, developed the skills of observation and mental preservation of important and/or useful events or they recognized helpful facilities of plants and animals in their surroundings from their early beginnings.

Through combination of these empirical observations and by analysis of their background some of these human “skilful dwarfs” used the abilities of plants and animals (later also those of fungi and bacteria) to develop products and measures for survival of diseases or of other critical conditions, which would have killed nonadapted competitors.

Of course plants were first recognized by mankind as beneficial in times of disease. Wise women or magicians – often accused of practicing diabolical witchcraft – have learned over thousands of years to prepare extracts or to use whole plants or their fruits as medicaments or as important contributions to daily food.

At the very beginning – apart from the isolation of extracts – nobody really knew the active compounds in plants, for example nobody knew, why the powder of the South American *Cinchona* tree helped as a powerful remedy against the malaria fever or why extracts of the bark of the willow (*Salix* spp.) suppressed fever and decreased headache. As soon as the methods of chemistry allowed the analysis of details and synthesis processes had been evaluated, medicaments or insecticides etc., based on pure chemicals were developed (e.g., quinine and acetyl salicyl acid instead of bark powders of *Cinchona* or *Salix*). This industrial production of chemotherapeutical remedies still flourishing after 100 years, however, led to the loss of the details of the mostly orally transmitted knowledge on the abilities of many plants and animals, but also led to the discovery of the effects of useful bacteria and fungi as highly effective antibiotics.

Since these chemicals were very pure and often based on a single active ingredient, infectious bacteria, fungi, or parasites developed increasing resistances against these agents, as occurred in the case of MRSA (multiresistant *Staphylococcus aureus* strains) where the efficacy of chemical medicaments became very low or even lost. These events make it understandable, why Jean Jacques Rousseau’s original cry “*Back to nature – retour à la nature*” resonates even more loudly today. This stimulates many scientists to test the efficacies of plants and animals against adverse impacts that may affect plants and animals and respectively endanger humans.

The wave of relevant plant-based papers in many scientific journals is growing daily, so that single results can hardly be seen. This is due to the fact that many authors prefer to collect published papers as goodies for their career and forget to develop from their results useful remedies for society.

The present book presents some selected reports on the efficacies of plants used as medicaments, insecticides, and/or parasitizides. It also includes examples of the practical aid given by animals in the fight against pests or describes their use as remedies and to diagnose diseases.

Some chapters show how extracts or particular stages of animals contribute to human or animal health, help in healing wounds, or aid the police in finding the murderer (in case it is not the gardener as usual).

These 15 chapters should stimulate more scientists to think about similar studies hopefully leading to successful products, but they also show the risks that may arise in times of worldwide globalization and regional climate change,

when species of fungi, bacteria, plants, and animals are introduced willingly (e.g., as “biofighters” against crop pests) or unwillingly into other environments (as hidden passengers inside the bodies of tourists or inside containers with goods of any kind).

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Heinz Mehlhorn

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