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COVID-19 pandemic from an ecological perspective

Pandemia Covid-19 z perspektywy ekologicznej

SUMMARY

This publication continues the analytic thread of the first author's previous publications (Wasilewski B., 2020 a, b) which interrogated the barriers to a fuller understanding of the COVID-19 pandemic. One of the main obstacles to understanding the phenomenon of the current pandemic is the analysis of this phenomenon is shorn of its ecological and evolutionary perspectives (Wasilewski, Egan, 2018; 2019; Wasilewski, Yourtsenyuk, Egan, 2020). The intention of this paper is to discuss further important issues related to COVID 19 and suggest an analysis derived from these named perspectives.

Key words: COVID 19 pandemic, ecological perspective, human being as a biocenosis, evolutionary perspective.

STRESZCZENIE

Publikacja podejmuje analityczny wątek wcześniejszych publikacji pierwszego z autorów (Wasilewski, 2020 a; b), w których analizowano bariery utrudniające pełne zrozumienie pandemii COVID-19. Jedną z głównych przeszkód w zrozumieniu fenomenu obecnej pandemii jest, zdaniem autorów opracowania, analiza tego zjawiska w odezwaniu od perspektywy ekologicznej i ewolucyjnej (Wasilewski, Egan, 2018; 2019; Wasilewski, Yourtsenyuk, Egan, 2020). Intencją obecnego artykułu jest omówienie kluczowych kwestii związanych z COVID 19 z punktu widzenia analizy prowadzonej z wymienionych wyżej punktów widzenia.

Słowa kluczowe: pandemia COVID 19; perspektywa ekologiczna; człowiek jako biocenoza; perspektywa ewolucyjna

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INTRODUCTION

The evolution that led to the creation of man in his present form was mainly based on blending the preceding evolutionary form into that which followed, supplemented only by a functional enhancement. This has been a process since that period when only the simplest organisms that did not yet have a cellular form existed and these (in numerical terms) still dominate the composition of our planet's biosphere. The next stage of evolution was the formation of cellular organisms that integrated with subcellular entities- and using them as permanent, functional elements- gradually organized themselves into ever more complex colonies, the most complex of which is man.

This paper focuses on the authors' hypothesis that the essence of the COVID-19 pandemic is the reduced effectiveness of the evolutionary mechanisms integrating the human being with its complementary biotope. This integration has allowed the human being to co-exist with the world of viruses both in an endogenous form – and as such they constitute part of our human morphology- and the exogenous form with which we constantly interface, including those we consider pathogenic. The authors attempt to outline the complexity and interrelationships of the human body with its complementary biotope and the sensitivity of this complex, to the toxic effects of factors linked to our industrial civilization.

Our body is a multicellular structure, analogous to other organisms of our planet and as such represents a recognisable point or stage in the evolution of our planet's biosphere. It is a transfer link in that ever-flowing stream of matter in its corpuscular, wave, organic and inorganic manifestations. Information passes through us and energy exchange within us, constantly operates to link Man with the biosphere of which we are but an element. Our body components are thus constantly exchanging within our liminal structures and are co-eval with integrally related living organisms, including viruses. Constant change defines our bodily existence, the life of our epithelial cells

is only a few hours and within a few years we exchange almost all of our body's atoms. We constantly exchange the atoms which compose us, not only with the stock of matter limited by the shells of our body, but also with those atoms in an ever-expanding environment reflecting globalization and the movement of people and goods.

Until recently we treated atoms as the lifeless building material of our bodies, but now recognise that irrespective of the distance between them, spin-paired atoms remain in constant contact with each other, enabling the transmission of information. From the perspective of the exchange of atoms within the Earth's biosphere, we are one large community of which the biosystem of the body is a microcosm. The same pool of atoms within our bodies circulates in a rotational way, supplying both human and bacterial cells which together with viral and prion microorganisms combine uniquely to construct Man.

The scientific facts available today challenge the anthropocentric belief that only humans are capable of thinking, animals guided only by instincts and the rest of organic matter- passive building blocks. The capacity for thought is not only the ability to comprehend abstract phenomena- which today seems to be decreasing in humans- but also mainly the ability to collect, process and optimally use information. In this sense, thinking as such is a common feature of living organisms and not unique to Man. The cells of the human body in the process of evolution, have lost many of the features necessary for independent existence. But, as a consequence have gained the ability to perform highly specialized functions while still remaining living, thinking organisms. We know today that the chromatin nucleic acids of each cell, apart from storing the genetic record, have capabilities similar to efficient computers for storing and processing information, a property also possessed by proteins (Lu, 2020; Woods, Doty, Myhrvold et al., 2019).

HUMAN BEING AS A BIOCENOSIS

If now we return to the topic of the human-virus conflict, it is important to accept as fact, that we intimately cohabit as it were with viruses that are a vital, integral part of our body and in a sense, we cooperate with these same entities. In the case of a viral infection, it is not so much about contamination of the supposedly sterile space of our body, but rather the violated homeostasis of our body's biocenosis, facilitating entry of pathological, exogenous viruses. The multi-component barrier which has evolved over billions of years and enabled our survival through its protective capacity, has been severely damaged by a toxic industrial civilization- the extent of which has spread rapidly throughout our planet over the past 200 years (and especially the last decades).

The thrust of our thesis is that the main cause of the COVID-19 pandemic is not simply the appearance of the SARS-CoV-2 virus, but the result of human activities which have had negative impacts on the ecosystem of the living earth's shell for over 2 centuries. The doubling of the human population within 60 years (currently at approximately 7.7 billion individuals) has radically reduced and often eliminated many "wild animals" who hosted such protective viruses and dangerously impacted the surrounding biotope. Human living conditions have changed radically facilitating penetration and mutation of viruses, as large population clusters have arisen (e.g., Wuhan). In tandem with these changes, there is increased intensity of contact with ever greater numbers of people in artificially ventilated areas such as hotels, stadiums and conference halls. Thus, given the high prevalence of viral infections, the presence of minimally symptomatic or asymptomatic vectors and the persistence of viruses on shared items, viral transmission in workplaces and other sites of human interaction is inevitable.

Circumstances conducive to the transmission of infection include overcrowding of both animals and people and industrial farms breeding animals for meat, are a particularly

dangerous threat from an epidemiological perspective. In this situation the host cell is simultaneously infected by two different viruses, which leads to the emergence of new, more "mutational" variants with better capacities to extend their range and infectivity. In addition, animals in such conditions are frequently almost cheek to jowl with people (often e.g., immigrants) who work in meat processing plants and who themselves live in poor, overcrowded and unhygienic conditions. And so, the resistance of both man and animal to viral transfer is reduced, fertile conditions for the emergence of pathogenic strains and further epidemics is possible and an enabling environment now exists for animal viruses to transfer and colonise a new host- man! Eating animals such as bats is an example of how viral transfer is facilitated and in which the mechanism of endogenization of RNA viruses occurs as previously seen in the case of human phylogenetic protoplasts.

Scientific progress has demonstrated how essential to human life in terms of biology and psychology, are its links with other elements of the biotope that have been permanently disturbed in the industrial age. Researchers now increasingly conclude that the industry- damaged biotope has triggered the mass extinction of species (Barnosky, Matzke, Tomiya et al., 2011; Brooke, 2018). The extinction process does not spare humans (Wasilewski, 2014; 2018; Wasilewski, Egan, 2019) and is particularly visible in the West, where it is characterized by reduced immunity and fertility. Life enriched with health and creativity is shorter today and more and more emphasis placed on preparing for retirement from the stress of today in anticipation of rest, regeneration and renewal. Unfortunately, at the same time, the activation of self-destructive processes such as thanatosis continues apace, in tandem with ever increasing incidence of civilization- induced diseases (Wasilewski, 2008; Wasilewski, Egan, 2018; 2019; Wasilewski, Yourtseyuk, Egan, 2020).

To ensure that life continues, it is necessary that we cooperate with millions of other

biological entities to which man is inextricably linked, including those from the microbiological world, such as bacteria, fungi, viruses, prions and macro-organisms such as trees, animals, plants and other people. Man, thanks to his integration with these myriad elements of the biotope, breathes, nourishes and indeed heals himself. He absorbs the products of other elements within the biotope of which he is part and constantly exchanges with it those atoms that make up his body in a process frequently repeats in the course of a lifetime. He possesses a fairly high degree of autonomy and is able to move independently, but for the reasons above outlining his integration within the biotope, is unable to live independently outside it. The human body is therefore a transitional form, a transit element of matter, which is in constant fluid motion and in which communication is maintained despite translocation. Quantum physics confirms this thesis, by demonstrating that displaced elementary particles still maintain constant contact with the matrix through the quantum entanglement mechanism. Man in this material expression of his existence is an integral element of that living structure we term the biotope, but there are many indications that this integration is not limited to a merely material exegesis. The entire animated world is capable of generating and processing thought, so animals, plants and other living creatures are capable of thinking to varying degrees of complexity-and recently even machines have been designed with primitive thinking capacities. Thus, there is increasingly a gradual blurring of the distinction between material and non-material existence, between the nature of animate and inanimate and between living and the surrounding dead matter which formerly was understood to be solely a passive entity and incapable of thought.

We still have only partial information on the interaction of organisms that make up the biotope community of our bodies. Our knowledge on how the chains of connections serving homeostasis function in humans is fragmentary, although it is more widely understood and known for plants and some animals. Examples

include the symbiotic relationships of plants with fungi (mycorrhiza) and bacteria (bacteriorosis), or the interaction of aphids with viruses carrying genes necessary for the periodic growth of wings needed for the transmission of the aphids to the new host.

MICROBIOME AND COVID-19

The human microbiome and in particular the role of the gut microbiome in human immune mechanisms (with significance for COVID-19) requires further discussion. The intestinal tract prevents pathogen access to the sensitive interior of our body by a specific barrier composed of a mucous membrane which has a huge surface area of about 400 square metres. However, the human immune system operating from and within the tract itself constitutes the core of the human immune system and plays a significant role in maintaining tissue homeostasis. The human intestine is known to house many microorganisms (intestinal microbiota) and has also the largest clusters of immune cells in the body, which are part of that important complex- gut associated lymphoid tissue (GALT). It is estimated that 8% of people suffer from impaired physical integrity of this barrier, while functional disorders of the barrier components and in particular the composition and derangements of the intestinal microflora (Microbiota), are more frequent. The framework of this study does not allow for an in-depth discussion on the consequences of a poorly functioning microbiota, including its significance for the body's immunity and the prevention and resistance to viral infections. It is noteworthy however, that the tightness or integrity of the intestinal barrier is closely related to the condition of the intestinal microbiota, as in the example of the interactions of a bacterial strain – *Escherichia Coli* Nissle 1917.

The current understanding of the human immune system is so inadequate, that actions to optimise immunity are as misguided as attempting to boost computer performance by increasing the voltage. There are still major gaps in our knowledge of the immune system,

e.g. its functions and interactions, but we are acutely aware today of the on-going destruction of natural immune mechanisms. This has forced us to ever more radical action to compensate for the shortfall and thus become increasingly dependent upon an uninterrupted series of artificial immunizations and repetitive administration of antibacterial substances. Apropos antibiotics, non-selective administration of biocides destroys our microbiota and exposes us to common diseases such as diabetes, obesity, atherosclerosis and inflammatory bowel disease. Previously the observed dysbiosis was considered either a cause or a consequence of the above diseases but recent research using more sophisticated techniques confirmed that dysbiosis of the intestinal microflora primarily leads to the development of type 1 diabetes (Zhou et al., 2020), a similar relationship was found in relation to Alzheimer's disease (Marizzoni et al., 2020)

INDUSTRIAL CIVILIZATION AND COVID-19:

The authors' thesis is that the main cause of the COVID-19 pandemic lies in the *decline of immunity following the adverse impact of industrial civilization* and is based on an analysis of mortality rates related to the Covid 19 pandemic (Wasilewski, 2020; Wasilewski, Yourtsenyuk, Egan, 2020). Observations suggest, that although the number of infected people per 1 million population in Asian countries with an uncontrolled pandemic is not lower than in the countries of the West, deaths per 1 million are significantly lower. In the USA this was 1385/1 million on February 7, in India 114 and in Pakistan as little as 54. A comparable situation exists in Japan (population 126 million), where Covid-19 death rates are also very low (50 deaths/1 million people) (<https://covid19.who.int/> WHO COVID-19 07. February 2021).

The likely mechanism to reduce mortality is the ability to counteract the so called "cytokine storm" and thus prevent deaths from Covid-19 pulmonary complications. This may also be associated with a lower incidence of biofilm

linked -chronic respiratory infections by antibiotic-resistant bacterial strains. A thesis occasionally presented, links increased resistance with the high consumption of the spice turmeric, which may stimulate the immune system in the above-mentioned Asian countries. However, a more convincing thesis posits that a lowered incidence of Covid 19 is directly related to less industry related disturbance of Biom functionality. It is interesting that communities living in areas from the Amur to the Don, including Buryatia and Mongolia are known to have unique set of microflorae. This has developed over the ages and apparently exhibits a unique and increased resistance to negative environmental factors. Nevertheless, industrial civilization as it continues apace, is on course to further change the composition and disturb the functioning of the intestinal microflora in such populations.

Most of us believe that the integrity of our bodies is maintained and protected by natural barriers created by the skin and epithelium of the respiratory and digestive systems. This is not altogether correct, viruses easily overcome the various barriers mentioned and thoroughly saturate our bodies, including those potentially pathogenic and a threat to life. As long as the defence and repair mechanisms referred to earlier (and later) function effectively, these are neutralised and we remain healthy.

There are three intestinal tract defensive barriers which protect us: The physical barrier (epithelium, tight junctions, mucus, commensal bacteria), the biomedical barrier [antimicrobial proteins (AMPs)], and an immunological barrier (lymphocytes and IgA). Although we are endowed with three functionally related isolation barriers, they are not an effective barrier to viruses. It is estimated that there are 10^9 - 10^{15} virus particles in one gram of intestine, although the function of such a strongly represented intestinal virome has not yet been fully understood. From our current and admittedly incomplete knowledge we can reasonably conclude that the endogenous population of viruses compete with exogenous viruses and inhibit or neutralise forms unfavourable to our bodies.

This is confirmed by phage studies (Nguyen, Baker, Padman, 2017), showing that the intestinal barrier does not block the penetration of a large number of viral phages, and that their subsequent spread through circulation provides antibacterial and antiviral protection.

The number of human cells is greatly exceeded by those of the microbiome in which the most numerous are the bacteria. More recent studies conducted in Israel (Sender, Fuchs, Milo, 2016) compare the number of bacteria in the human body (3.9×10^{13}) to the number of nucleated human cells (0.3×10^{13}) showing a tenfold quantitative advantage of bacteria.

The mental barrier that hampers the perception of the organism from a microbiological perspective is the traditional thought pattern which assumes the body to be subordinate to the divine soul. The concept of a body directed by an immortal soul and created by God in his own image, is completely different from that of a cell community, which in effect is the human organism. An example of the simplest form of an organized community is the aforementioned biofilm, which consists of bacterial cells and enables better survival of individuals that make up the biofilm. This structure is a stage in the evolutionary journey to complex multicellular organisms such as animals. Diverse cellular participants of such a community, despite narrow specialization still retain some basic characteristics of independent organisms, including the ability to analyse conditions of the surrounding environment and adapt appropriately.

The human brain is mainly responsible for operational functionality at the level of the social macro-organism, but is not only an effector and regulator of biological functions including that of immunity. It acts also as a centre cooperating with the local peripheral “brains” of the autonomic nervous system, which modify the functioning of self-steering systems and affects cells throughout the body. The homeostasis of our body’s biotope, results from the cooperation between the cell groups which compose the body’s organs and their “alive” bacterial and subcellular organisms. Cell groups that

make up the human and other animal organisms, are able to analyse microenvironmental changes and respond with adaptive actions-competencies also possessed by simple cellular and subcellular organisms.

The facts quoted above show how our body resembles a community of independent beings gathered in the physical mantle of Man – the body’s envelope! There are many indications that he does not fully control it and directs it only in the area of selected functions, although he is convinced that only he – the only one in creation – has and is distinguished by the gift of thought. There are many indications that he does not fully control or guide it, although he has the conviction that only he- unique within creation- possesses and is distinguished by the gift of thought. We must smash the pedestal of this monumental conceit that thinking is only a human proclivity and recognise that all living matter “thinks”. Recall that bacteria, viruses and proteins are able to store information, process it and implement changes in their structures and functioning.

We humans have an indirect and usually a negative influence on the biocenosis that constitutes our body’s, as demonstrated by the current confrontation between man and the SARS-CoV-2 virus. This escalation however, is only the culmination of a guerrilla war which has raged with increased ferocity between man, viruses and related macrobiotic microorganisms since our entry into this industry-dominated epoch of our civilisation. Unfortunate outcomes of that violence, include: the systematic destruction of interactive links connecting the ecosystem of the human body with the hitherto relatively untouched external ecosystem and the conflict-generated toxic chemistry which wreaks havoc on both internal and external ecosystems. The constant, conflict-sourced injury to biocenotic activity, has led to a disturbed homeostasis and disruption of a finely balanced functionality. This in turn increases the pathogenicity of viruses and bacteria, generates a defective immune response and decreases resistance to infections.

The flagship achievement of the industrial age is the extension of life expectancy, especially evident in Western civilization. This has been achieved mainly by the elimination of hunger and reduction of perinatal mortality, but also by controlling and treating infectious diseases. The sequence is well known—public health measures were instituted, preventive vaccination programmes started, antibiotic therapy introduced, and the widespread use of biocides was hailed and advocated.

The “golden” period of antibiotic therapy was characterised by a surge of scientific research in the laboratories of the developed world. New compounds with antibacterial properties were developed, existing compounds were modified to improve their pharmacological effect and novel properties detected in many of the newer compounds discovered. Efforts were made and indeed accelerated to manage any threat of bacterial resistance to preceding generations of drugs. This “idyllic” situation has changed however since the mid-1980s, as the development of newer biocidal agents has dramatically slowed. Ominously, an increase and spread of different or newer forms of pathogenic organisms has been observed and these have boosted resistance and decreased sensitivity to previously effective drugs.

As the rate of pathogen emergence and drug resistance increases, the effectiveness of existing biocides spins downwards and (for market reasons) the development of potentially effective drugs is no longer a priority. Bacteria have adapted to this new scenario by creating pathogens such as the New Delhi bacterium which is resistant to all antibiotics and is an analogue of *Klebsiella pneumoniae*, which co-habits with most people without causing disease. An analogous situation seems to exist in the case SARS-CoV-2 virus which is the progenitor of the COVID-19 virus causing the current pandemic. This new virus belongs to the group of coronaviruses with which we have co-habited for millions of years but is now capable of breaching the biological protective fortification we had evolved.

Before birth, the foetus (and earlier the embryo!) is often exposed directly and indirectly to chemical substances which may alter or damage the developing immune system. Shortly after delivery and in subsequent months and years, the infant receives several prescribed vaccinations which force the immune system to develop differently from how it would otherwise develop i.e. naturally and in lock-step with the complementary ecosystem of the biosphere. This altered trajectory to achieve immune competence is congruent with a progressive dystrophy of the immune system which we associate with the already operational process of our extinction as a species (see Wasilewski 2019; 2020) This is now leading to an intrinsically disabling sequence in which man must first use a protective shield, then progressively adapt to cocoonization and isolation from that complementary part of the biocenosis which originally constituted the source of his immunity. These views should not be misunderstood, we are not opponents of vaccination, but rather advocate for its more rational use in a situation where we do not have the luxury of a choice – a direct consequence of the destruction of many natural mechanisms that have hitherto protected us.

Science increasingly reveals the weaknesses of our immune system which in essence is the cause of our susceptibility to the COVID 19 pandemic. The current acceleration and intensification of research to counter COVID 19 clearly demonstrates the research gaps, the omissions and the fragmentation of information on the Biocenosis/Man complex and its interaction with the external Biocenosis that complements it. With such fragmented knowledge we are not in a position at present to comprehensively and systematically describe the many causes of vulnerability to the COVID-19 pandemic. One of the identified causes however, is a deficiency in the production of type I interferon, currently recognized as an important component of the immune response, the lack of which does not bode well for an optimal COVID-19 cure. It has been shown that mutations in the genes responsible for its production

of interferon I (Zhang et al., 2020) and the presence of “autoantibodies” inhibiting the activity of type I interferon, occur in more than 10% of people suffering from an unfavourable course of COVID-19 infection, whereas in the general population they are found in only 0.3% of the general population (Bastard et al., 2020). There are as yet no comparative studies to determine the extent to which these factors are responsible for the more serious course of SARS-CoV-2 infection in Westerners. It is reasonable however to assume that the increased incidence of congenital defects of the immune system, is largely the result of controlling the hitherto high mortality of children (due mainly to infectious diseases) through the extensive use of antibiotics. Such indiscriminating use (particularly in the West) has maintained health in a cohort of individuals with immune system defects who in the past would have died or been seriously and chronically ill.

BIOCIDES AND COVID-19

Another (previously mentioned) contributing factor to the COVID 19 pandemic resulted from the widespread use of biocides that induce the activation of adaptive mechanisms in bacteria. One of the defense mechanisms of bacteria is the permanent implantation into the mucosa using biocide-resistant structures of the biofilm, which as a side effect increase the porosity of the mucus barrier, thus allowing the penetration of viruses.

The irresponsible use of chemicals in the last century is another factor which impacts negatively on the microflora of the digestive system, a community of microorganisms which interact with GALT – the intestinal lymphoid tissue. This can synthesize over 20,000 antibiotic-like substances, deactivate toxins and perform a number of other functions necessary for the body.

The scope and structure of this review, allows only a superficial and selective treatment of the impact the numerous synthetic chemical substances impregnating the body and environment have on the human microbiome.

Examples of these substances are the degradation products of plastics – bisphenols, the presence of which is already found in the urine of young children. Bisphenol A (BPA) is a common toxic substance with an acceptable concentration level of 0.05 mg / kg body weight, easily penetrating the skin, digestive and respiratory systems. BPA is found in many substances including food and it binds to estrogen receptors in both animals and humans and mimicking a natural compound, it accumulates in the tissues from which it is gradually released. Its production in 2013 was estimated at 6.8 million tons, most of which are polycarbonates.

Many plastics contain heavy metals that are used as stabilizers and have strong properties to absorb and attract other contaminants, including toxic heavy metals, other endocrine disruptors and persistent, organic pollutants. Today, about 70 years after the introduction of plastics into general use, their annual production is over 300 million tons. Almost all plastic waste begins its “journey” on land, is carried by rivers and ends in the ocean, where huge floating islands of waste accumulate and increase every year. The expanding garbage patch in the Pacific Ocean was once called the eighth continent and over time and as a result of sunlight, its plastic content degrades into micro- and nanoparticles that remain in constant circulation-entering inevitably into our water and food. Toxic products of plastic degradation and combustion of organic substances increasingly constitute some of the most toxic air pollutants affecting urban settlements and access the body’s interior through the respiratory tract.

Environmental pollution as described above contributes to the mass extinction of animals and bacteria, including those producing oxygen and as yet we do not have data on the effect on viruses, viroids, phages and other sub-cellular organisms. However, it is a reasonable assumption that effects at micro level, mimic or are analogous to those observed at the macro level.

Another group of biocidal compounds (biocides) which damage the microbiome

continues to be produced and as an anti-pest strategy is used in a wide range of industries to eliminate living organisms such as viruses, bacteria, fungi, insects and animals. Examples include disinfectants, wood preservatives and insect repellents which when used excessively or inappropriately, facilitate the development of antimicrobial resistance which cannot be overcome by currently available antibiotic therapy. In addition, the widespread use and production of biocides promotes the spread of genes that facilitate and regulate antimicrobial resistance. Transmission between bacteria of the same or different species of genes responsible for drug resistance is facilitated by urbanization and the agricultural use of material from sewage and other waste. A similar mechanism can facilitate the transmission of RNA viruses, including COVID 19 (Tian et al., 2020; Reyed, 2020).

Biocenosis of the human body developed during several million years of its phylogeny, a fact confirmed by the presence of intercellular fluid in our body which has a proto-oceanic composition and the presence of bacteria whose phylogeny dates back billions of years. Maintained over the aeons the stable internal homeostasis of our body has been overwhelmed by the challenge of managing our body's impregnation by over 100,000 chemicals—mostly synthesized within the last 150 years. The body cannot mount a timely defence and adapt effectively in the face of such a sudden assault. Many highly reactive and powerful chemicals were introduced and used (sometimes on a global scale) without any research on the subsequent functional competence of the human body and the surrounding biotope. Too often, the only method (from a health perspective) to investigate the newly manufactured substances and new technologies, was to observe the basic health parameters of those exposed to them. This observation often did not include the delayed and cumulative negative effects we are currently experiencing. Neither was the impact of such materials on the efficiency of our innate defence and adaptation mechanisms sufficiently studied. Standard investigation of toxicity

in the newly introduced chemical substances mainly involved observation schedules (for acute and sub-acute poisoning) and monitoring of mortality and morbidity e.g. significant organ (or organism) dysfunction after administration of high doses. The effects of chronic administration of the test substances were examined superficially and piece-meal and the microecological and ethnotoxicological analyses conducted with poor consistency and little scientific rigour.

The COVID 19 pandemic has disabused us of the widespread belief that civilization's greatest achievement in the 19th and 20th centuries— that of overcoming the scourge of infectious diseases and doubling human life expectancy— is sustainable. But as with other “achievements” of the industrial age, the cost to achieve this objective is the near exhaustion of natural resources (including health). Increasing longevity was achieved primarily by improving the health status of the richer part of the earth's population, while neglecting health hazards which continue to plague the masses in the poorer section of the globe—poverty which is further aggravated by the COVID 19 pandemic (Economist editorial, 2020). In the fight against viruses, including the SARS-CoV-2 virus, we rely on stimulating natural immune mechanisms in addition to current, well known protective measures such as mask wearing, social distancing etc. In fact, we imitate a “natural” contact with the virus by administering a vaccine. Being “civilized” and separated from contact with viruses and bacteria of the biocenosis in which we naturally lived for millions of years, we have become susceptible to microorganisms to which we formerly had immunity. As a result of civilization and its complex interactions, we have created conditions for the emergence of highly pathogenic microorganisms, resistant to currently available antibiotics. Key sites for the generation of such pathological entities are industrial farms and slaughter houses with unfavourable working, processing and storing conditions. This constellation of circumstance, combined with the violation of natural ecological niches

of animals and related microorganisms, has opened a Pandora's box of potential biological plagues. Man in pursuit of what he terms "progress" has gradually detached himself from his natural environment by means of mechanical and chemical screening, a technology which recreates or mimics our former naïve state. Additionally, he damages his internal biotope with chemicals used for "disinfecting" the environment and the food he eats. It is not an exaggeration to state that modern man exists in an environment which constantly generates life-damaging effects, through massive chemicalization of the environment.

CONCLUSION

In our opinion, the key to understanding the COVID 19 phenomenon is to rationally interpret the COVID 19 pandemic as an impulse accelerating evolutionary change in the human species. This has the effect of stimulating the transition of our species from an individual, loosely bound existence to one in which each person is an integral part of the macro-organism. Every man now plays a specific role within the biotope, but it is one in which the degree of adaptation to a specialized function, largely prevents it from existing independently.

During earlier significant phases in the evolution of the Earth's biotope, a significant acceleration in the scope and rate of evolutionary change was triggered by the need to adapt to a significant and negative alteration in the natural environment. However, in recent centuries such changes have been caused by man's on-going industrialisation. The enormous pillaging of the biotope when challenged, continued to be "justified" by a distorted vision of progress during the industrial era. This mutilating process affected the macro and micro-organisms necessary for life, propelling man and much of the biotope to enter the extinction phase (Wasilewski, 2019; 2020). Earlier calamitous changes during the Earth's evolutionary trajectory resulted in massive planetary "resets." Such events occur when the development pathway leads to a cul- de- sac and one

that cannot be overcome with a linear, gradual transformation. In such a dead-end scenario, the biotope then loses its steerability and control over regulatory mechanisms and self-destruct mechanisms are triggered. The effect is to reduce the biotope to a size that allows it to restart, reorganize and regain the potential for rapid reconstruction. A similar process may be constituting the fate of humans as a species at present. Within the paradigm just described, the COVID-19 pandemic can be regarded as a regulatory mechanism within the biotope of the Earth's crust, launched to eliminate factors which critically and negatively affect its functioning capacity.

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