PROCESS PHILOSOPHY AND COVID-19: TOWARDS A PROCESSUAL EXAMINATION OF CORONAVIRUSES

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ABSTRACT

As the world struggles in the face of the deadly covid-19, there is an uncertainty as to the twist of which a particular vector may undergo within a given historical period. This uncertainty, no doubt, is the route in which coronavirus employ overtime whenever it strikes the human population. In other for us to have an insight into the nature of coronavirus diseases, it becomes necessary that we study the morphology of the virus. This is necessary because the virus is, undoubtedly, a serious reality that stares us in the face. However, the discipline of philosophy is committed to understanding the basic nature of reality. But the explanation of reality by philosophers have often assumed two basic positions: the substance and process view. While substance philosophy or ontology conceives of reality as a basic entity, process philosophy on the other hand sees reality as creative and progressive. In this work, we subscribe to process view of reality. This is because process philosophy conceives of reality as an unending novelty which gradually unfolds as nature itself progresses. It is in this sense that this work seeks to reawaken the process consciousness in seeking measures to curtail the present effect and subsequent recurrence of coronaviruses related pandemic. Using the speculative method of philosophical investigation, the paper maintains the position that creativity, progress and interconnectedness characterizes entities in the world, be it plants, animals or pathogens. Our position is that the current outbreak will not be the last time humanity will witness a coronavirus disease of such epic proportion, hence, in seeking preventive measures to curtail future recurrence, medical scientists must take into consideration, the creative and progressive nature of the virus using clues from process philosophical ontology.

Keywords: Process philosophy, coronaviruses, Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), pandemic, progress and creativity.

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INTRODUCTION

One very appealing aspect of process perspective to the study of organisms, according to Dupre and Nicholson (2018), is that it makes ontological inadequacy of the machine conception of the organism explicit. If organisms are processes rather than substances, then conceiving of them as machines inevitably leads to distorted understanding of them. Past centuries have witnessed the recurrent attack of deadly viral pandemics in the world. Whenever these attacks occur, they showcase the weakness of man on the event of things in the universe, living him at the mercy of nature. Ironically, the advancement in medical sciences have not done enough in finding a permanent solution to the frequent occurrence of deadly epidemics in the world. In "Microbiology and Medicine," Greenwood and Barer (2012) observes that: The investigations and discovery by scientists in the area of microbiology had help human beings to improve on their health and life expectancy. The area that needs to be investigated is the area of deadly epidemics that always occurs in the world.

This presents us with the hard reality that as humanity advances and strive for survival in the face of deadly diseases, there is also an advancement in the morphology of micro-organisms, hence, to curtail their deadly effects call for our knowledge of microbes as being progressive. This seems to be the view further expressed by Greenwood and Barer when they warn: It is the neglect of imagination on the part of the micro biologist that makes serious health problems such as hospitals-acquired infection and antibiotic resistance. They need to know the history of infection in order to improve the present knowledge of infections.

The 2019 coronavirus disease must have taken the world by surprise, but it is not the first time in the history of mankind that the world would witness the catastrophic effect of coronaviruses. But one thing stands out as we struggle to fight the virus: it is the progressive nature of the virus since it was first discovered. This forms the core objective of this work. In this paper, we seek to defend the thesis that the effective understanding of the coronavirus demands that we approach the virus as a progressive agent which is self-creative and constantly develops. This informs our process philosophical out-look at the coronavirus. As the novel covid-19 brings the world economy and social activities into a standstill, the need for man to understand that humanity must never give in to disaster becomes a necessity. However, "the novel corona virus outbreak (COVID-19) demands that we take a lesson from our past experience in tackling the devastating situation" (Jahangir *et al,* 2020), and in preparing for its future occurrence. Hence, the need to x-ray the novel covid-19 in the spectrum of process philosophy as against any substance conception of the disease. This is because the application of process ontology far more agrees with the description of the nature of life as conveyed in recent research in biological sciences and which in this case appears a more plausible position (Dupre and Nicholson, 2018), especially in our search for effective measures against the coronavirus now and beyond.

PROCESS PHILOSOPHY

Process Philosophy, according to *Stanford Encyclopedia of Philosophy* (2017), explores being as dynamic and in turn advocates that following the dynamic nature of being, processes should be the ultimate method adopted in the study of being in order to attain a comprehensive philosophical account of reality and our understanding of them. Process philosophy puts existence as a process at the forefront of ontological concern. A definitive feature of process philosophizing is not simply the commonplace recognition of natural processes as constituting an essential aspect of everything that exists. Rather, it presents the universe as a dynamic process of formation, creativity and interdependence. Andrew Reck (1975), is of the opinion that in process philosophy, reality is taken to consist of processes, and which, if it acknowledges elements other than processes, comprehends these elements, either as a whole or partially, as constitutive of the process framework. Process philosophy wants us to recognize that things that really exist are "not things made but things in the making" (James, 1925).

For Bergson (1911) and Whitehead (1929), process philosophy focuses on the science of becoming. It is opposed to substance metaphysics or philosophy. As against substance philosophy which conceives of existence as static, process philosophy is concerned "with the dynamic sense of being as becoming or occurrence, the conditions of spatio-temporal existence, the kind of dynamic entities, the relation between mind and world, and the realization of values in action" (Stanford, 2017). In the study of the nature of reality, process philosophy views process, flux, and development as constituting the primordial nature of existence (Nayak and Chia, 2011). It recognizes that our immediate physical life as we see and live it is, in the words of James (1996), a "big blooming confusion." He is of further opinion that our experience should help us to interpret what may come in the future. Process philosophy, therefore, construes relationship and association as primary features of existence. These primary attributes are what Alfred North Whitehead refers to as "actual entities." Hence, he explains process philosophy in the following expression:

> The actual world is a process, and that process is the becoming of actual entities… how an actual entity becomes constitutes what that actual entity is…Its being is constituted by its becoming (Whitehead, 1929)

Nayak and Chia (2011), Ansell-Pearson (2002), Bergson (1910, 1911 and 1998) and several other scholars see processual thinking as belonging to a vast wealth of philosophical knowledge that rejects substance conception of reality, instead, it maintains that progress and creativity constitute the real creative of existence. Process philosophy sees reality as visorous and consisting of series of processes or events. It also claims that nature itself is creative, thus, "creativity is foundational to the nature of things and that genuine novelty emerges within the process" (Lawhead, 2002). Traces of process philosophy is found in the four epochs of philosophy, starting from its ancient advocate, Heraclitus, to its system giver, Alfred North Whitehead, in whose philosophy the term was even invented.

Squaring process thought with African philosophy, it is meaningful to say that process philosophy is compatible with African world view as well. In African metaphysics, reality is a continuum. A clear instance could be cited in the African notion of death, where death, rather than being the end of all human possibilities (see Heidegger, 1962 and Sartre, 1956), is conceived as a transition, a process into a higher realm of existence – the spiritual realm. Similarly, the African conception of reality is characterized as a force in which all forms of intelligence partake. No African scholar captures this more than Alexis Kagame, who introduces the concept of "Ntu" to express the interaction and interpenetration of forces on the one hand and the dynamic character of reality on the other hand (see Kagame in Unah, 2010). As noted by Nayak and Chia (2011), process philosophical thinking, therefore, offers us an invitation to "think about individuals, organizations, social entities (and organisms as well) in terms of ceaseless change, emergence and self-transformation." When our thought proceeds from the genuinely processual terms, it shows that we are thinking in terms of "difference in kind and their union" (Nayak and Chia, 2011).

PROCESS PHILOSOPHY AND BIOLOGY

Biology is the study of life and life-forms. In life, there is creativity and inter-connectedness. This cast doubt on the assumption that life is a composite of discreet, genetically, homogenous organisms, either single cells or the descendant of a single originating cell in the case of multicellular organisms (Dupre and Guttinger, 2020). This assumption supports traditional metaphysics and its position that the world is made up of things or substances. However, nature has proven over and again that seemingly stability of certain entities is dependent on the association between compound foundational processes (Dupre, 2012).

The idea that there is association between compound processes constitutes a problem to the traditional substance ontology of biological individuality. The inter-relatedness of biological things with other biological things is necessary to ensure the persistence of the biological system, this shows that biological systems are processes (Dupre and Guttinger, 2020). Viewed from this position, an organism may be construed, without contradiction, as a "balanced system in the movement of inter-connected natural processes" (Dupre, 2012). Adoption of process ontology in the field of biology is capable of helping "us to account for the problems generated by reductionism in biology" (Dupre and Nicholson 2018).

A BRIEF HISTORY OF CORONAVIRUSES

According to Schalk and Hawn (1931), coronaviruses were first diagnosed in chickens in 1931 and later as virus of creature such as bats, pigs and mice. However, the first case of human infection (the human coronaviruses) was first diagnosed in 1967. As pointed out by Almeida and Tyrell (1967), this group of virus was discovered in the upper respiratory tract samples taken in 1966. The discovery was a major step in the study of the virus as it assisted in unfolding the viral nature of the virus based on their form and structure during microscopic observation (Earnest, 2017). Following from the knowledge of the form and structure of the virus, further study led to the diagnosis of alpha and beta classes of coronaviruses in humans. Coronaviruses were first thought to only cause mild infections in the respiratory tract without posing any severe threat to global health (Bradburne *et al., 1*967; McIntosh et al., 1970). But the knowledge of the virus and the threat it poses to global health took a different dimension following the diagnosis of the animal origin of the virus in 2002, and this created an awareness about the possibility of coronaviruses pandemic.

Lipsitch *et al.* (2003), maintains that there are two notable pathogens of coronaviruses in humans that are responsible for the threat of coronaviruses pandemic in recent years. First is the Severe Acute Respiratory Syndrome coronaviruses (SARS-Covs) and the second is the Middle East Respiratory Syndrome coronaviruses (MERS-Covs). The SARS epidemic was first diagnosed in November 2002, in Guangdong, a Province in China, whereas MERS epidemic started in Saudi Arabia in 2012 (Zaki *et al.*, 2012). Accordingly, the World Health Organization report has it that the 2002 SARS-Cov epidemic infected a total of 8,096 people resulting in 774 deaths. Also, the Organization further reports that between 2012 - 2016, the MERS-Cov epidemic spread from Saudi Arabia to other Middle East countries, notably South Korea in 2015, with a recorded number of infections at 1,841 with 652 reported fatalities. According to Zaki *et al.* (2012) and Dorsten et al. (2013), the major cause of death is as a result of renal failure. Again, Eckerle *et al*. (2012), also maintains that MERS-Covs have been proven to target kidney cells.

Human coronaviruses are believed to have originated from animal populations. This claim follows the discovery of SARS-Cov and MERS-Cov in bats (see Kocherhansg *et al.*, 2001). From bats, the virus is further transmitted to other intermediate hosts like chickens, cows and civets, which in turn transmit it to humans. It is believed that what makes the virus a serious threat capable of causing serious pandemic is the ease through which it spreads among animal hosts of different species.

HUMAN AND ANIMAL DIAGNOSIS

The human coronaviruses were first diagnosed in mid-1960s, following an examination of reported cases of mild respiratory infections resulting in dry cough, sore throat and stuffy nose. Although the first diagnosed case of human coronaviruses occurred in the mid 1960s, it was, however, the outbreak of Severe Acute Respiratory Syndrome (SARS) of 2002 that acted as a gadfly, reminding man, of the greater threats that coronaviruses pose to humanity. According to recent studies, coronaviruses are responsible for about 15 - 30% of the total recorded cases of infections of the human respiratory system every year. Furthermore, the report maintains that both infants and the elderly, most especially those suffering from certain health conditions like hypertension, diabetes, and so on, are at a greater risk of contracting the virus. Accordingly, the infiltration of the respiratory tract by the virus leads to breathing difficulty, which explains the use of ventilators by patients in order to be able to breathe. The rate of fatality is believed to be very high among elderly people, especially those with underlying health issues like like hypertension and diabetes.

Coronaviruses are zoonotic, it is believed to have originated from animals hosts, from where it is transmitted to humans. Bat is considered the primary host of the viruses. From bats, the viruses are transmitted to intermediary hosts like civets, cows and chickens, through which humans are infected. However, human to human transmission is possible through contact with an infected person. Research further reveals that coronaviruses could also be responsible for a variety of disease in animals like mild or severe respiratory tract infections in cats and cattle (Fehr and Perlman, 2015).

GENOMIC DESCRIPTION OF CORONAVIRUSES

Rotham and Byrareddy (2020), have identified coronaviruses as one of the major pathogens of this present century that have the human respiratory system as its primary target. The coronaviruses have a spike-like appearance and consist of single-stranded, positive-sense and non-segmented enveloped RNA viruses that belong to the family of viruses called Coronaviridae. Coronaviridae is one of the three families of the Nidovirales order. This order is believed to be the highest RNA viruses with the estimated genomes of 27 - 31 kb. Coronaviruses could be classified into three broad groups, namely, 1, 2 and 3. According to Sneijder *et al.* (2003), the 2002 SARS-Cov was an early form of the group 2 coronaviruses judging from its extensive phylogenetic comparisons. Wang et al. (2008); Nash and Buchmeier (1997), affirm that for the whole group of coronaviruses, the 5' genome comprises of a replicas gene and the 3' gene encode structural proteins and non-essential proteins. They tell us that the infection of cells by coronaviruses occur when the virus bind itself to specific receptors that enter cells through direct membrane fusion which occurs at the plasma membrane or

through an endocytotic mechanism.

Giving a descriptive analysis of the structure of coronaviruses, Barcena *et al.* (2009) and Neiman et al. (2006), tell us that the protein-coated DNA and RNA cores of coronaviruses (also called virions) have spherical shape, and an estimated diameter of 125mm, according to research carried out through a special method called cryo-electron microscopic and tomographic technique. Accordingly, Klausegger *et al.* (1999), adds that these DNA and RNA protein-coated cores are made up of four different structures of proteins simply identified as, the spike, the membrane, the envelop and nucleocapsid, which controls the3' end genome of the virus. They further point out that there is also a fifth protein structure known as"the hemagglutinin esterase." The hemagglutinin's major function is that of binding sialic acids on the surface of glycoprotein and the regulation of acetyl-esterase activity. According to Cornelissen (1997), the virus enters the body through the S protein mediated cell and is transmitted through mucus.

METAMORPHOSIS

Coronaviruses undergo certain changes during transmission. These changes involve four distinct processes which include: (a) entry and attachment; (b) replicase protein expression; (c) assembly and release; and (d) replication and transcription (Jahangir *et al.,* 2020). The closeness of the virions to the host occurs when the S (Spike) protein interacts with its receptors. According to Jahangir, "the relationship between the S protein and receptors are necessary condition through which the infection of a host is possible. It also enhances the tissue stimulation of the virus" (Jahangir *et al.,* 2020). The process makes use of the enzyme, peptidase, considered to being the most receptive enzyme for some classes of coronaviruses.

The second phase, the replicase protein expression phase, is where the replicase gene reaction takes place within the RNA core genome of the virus. The third phase, assembly and release, occurs after the viral RNA synthesizes, to produce genomes of RNAs. The RNAgenomes of coronaviruses are produced through the negative intermediary ashore of the virus. Finally, the virus exhibits the ability to combine and recombine, giving rise to the replication and transcription phase.

CORONAVIRUS DISEASE 2019 (COVID-19) OUTBREAK

Covid-19 is a disease of the respiratory tract caused by the novel coronavirus. The name is in fact, symbolic of the year in which the virus recurred. According to the World Health Organization (WHO), The first case was reported by medical officials in Wuhan City, China, in December 2019. It was also reported that most of the people infected were shops owners, market employees and those that visited the market. This assumption was taken from the environmental sample taken from the market in December, 2019 where people examined, tested positive to the virus. This investigation made the authority believed that the market in Wuhan city was the source of the outbreak. The market was closed in January, 2020. However, after so many fears arising from the rate at which the virus spread and early fatality, the World Health Organization, on March11 2020, declared the virus a pandemic. As of July 16 2020, a total of active cases was recorded as "13,530,628 with a total of 587,572 deaths" (Elflein, 2020).

The United Nations Development Programme (2020) in the newsletter notes that the coronavirus COVID-19 pandemic is a defining global health crisis of our time, likening it to be humanity's major challenge since the end of World War Two. Following its discovery, the virus, within the shortest possible time has covered every continent of the world except Antarctica. A report by the UNDP (2020), further decries that, the effect of the pandemic poses more threat than being a global health crisis but also predicted that there will be an unprecedented socio-economic crisis as a result of the pandemic. The report stresses that for every one of the countries that the virus touches, it may end up creating a devastating social, economic and political tension with a historic effect.

CORONAVIRUSES AS AN ACTUAL ENTITY IN WHITEHEADEAN PROCESS PHILOSOPHY

Alfred North Whitehead pins the central idea of his process thought on what he termed "Actual Entity." According to him, actual entities or occasions could be conceived of as the final things of which the world is constituted. Essien (2011), notes that Whitehead's actual entities maintain their identity and individuality as they pass through the various

stages of becoming into being and perishing. For Whitehead, therefore, actual entities are spatio-temporally extended events or processes (Audi, 1995). Actual occasion is the substituted term employed by Whitehead for actual entities. Stumpf (1994), posits that: "Whitehead's actual entities are 'chunks in the life of essence.' As such, they never exist in separation but are intimately related to the whole field of life that palpitates on every side of them."

Hence, Whitehead wants us to view nature as a living organism having the same rule of life that guides all of its existence. For him, the world is made up of actual entities as the final real things (Stumpf, 1994). Again, he maintains that the ultimate metaphysical category that characterizes everything that exists is the category of creativity (Lawhead, 2002). This creativity:

Characterizes not only the activity of the artist, but also describes the activity of amoeba, a plant, and an electron as well. Each new entity comes into existence by emerging out of a background of previous events, and forms itself by unifying its causes in a novel way, bringing a new synthesis into the world (Lawhead, 2002).

Whitehead saw in our own self-consciousness, a good example of an actual occasion. He defended that the "direct evidence as to the connectedness of [my] immediate present occasion of experience with [my] immediately past occasions can be vividly used to suggest...the connectedness of all occasions in nature" (qtd in Stumpf, 1994).

For Whitehead, an actual occasion is an immaterial thing that could only be best understood in terms of experience. These actual occasions, though conceived as non-existent, continually happen. Hence, Whitehead's actual occasions "represent continually changing entities, this changing coming about through the input of entities upon each other," a position which led to his argument that "the subject and the object are both in a continual process of change, such that every experience the subject has affects the subject (Stumpf, 1994). Actual entities, according to Whitehead, have no permanent identity or history. They are always in the process of becoming; feel the impact of other actual occasions and absorb them internally. In this process, actual occasions come into being, take on a determinate form or character, and having become actual occasions, perish. To " perish" here implies that the creativity of the universe moves on to the next birth and that in this procedure, an actual occasion loses its unique character but is retained in the flow of the process. Whitehead, therefore, visualized reality as a continual process in which actual entities are constantly becoming, a process in which what an actual entity becomes depends on how it becomes. His emphasis is upon the notion of creativity as the fundamental characteristic of the process of nature (Stumpf, 1994). Whitehead rejects the thesis of simple; instead he beckons on us to see reality as a web of interconnected events (Lawhead, 2002).

An examination of Coronaviruses from when they were first discovered to the present would undoubtedly reveal that the viruses have undergone creative self-processes. Back in 1930s when they were first discovered, the Coronaviruses were believed to be common to animal host with no human infections. This must have slowed researches on its control measures. Over the years, however, the virus has progressed to becoming a pandemic as the world witnesses it today. Some medical experts, like Stuart Siddel, believe that the virus has an evolutionary tendency. In all, the Coronaviruses, like every other entity in the world, undergo evolutionary transformation, a process which depicts creativity and progress.

IMPLICATION: TOWARDS A PROCESSUAL EXAMINATION OF THE NOVEL COVID-19 AND CORONAVIRUSES NOW AND BEYOND

Following the 2002 outbreak of Severe Acute Respiratory Syndrome Coronavirus (SARS-CoVs), minimal mortality rate was recorded compared to that of Covid-19. We may raise the question: "what could be responsible for the high increase in the mortality rate and threat of Covid-19?" The Processual explanation to this mind-boggling question is that entities in the world grow as the society itself grows. In other words, creativity in nature is not only common to a particular specie. It is, therefore, not surprising that among the various strands of Coronaviruses, there is a collaboration, an interconnectedness that boost their immunity. This sentiment is shared by Sheahan, a research scientist, who points out that human Coronavirus provides an example of how a zoonotic pathogen evolved to infect and cause disease in humans (Sheahan, 2008). So as the world

battles Covid-19, what should be the attitude of medical scientists toward finding a lasting solution to the disease now and in the nearest future? The first step lies in the knowledge of the virus as an entity that constantly unfolds. In this case, it is required that efforts to curtail the effect of Coronavirus disease should not only focus on now, but should also take into consideration that future recurrence will always be more threatening.

What perspective should be adopted towards the understanding of Coronavirus diseases? It is a sad, but undeniable truth that Coronavirus diseases will reappear overtime. However, it is pertinent to watch out that future occurrences would be even more threatening except the scientific community remains in constant alert. According to research on coronavirus replication, it is believed that "Coronavirus genomes can rapidly develop compensatory changes to restore virus replication rate (fitness) while maintaining a new gene order" (Brian and Baric, 2005). This implies that though we will experience succour from the damning effect of Covid-19, we should, however, we should continue to preparing for any emergence. There is need to adopt the principle of process philosophy in seeking solutions to the threat of Coronaviruses. In developing this future plan, it should be taken into consideration, the creative tendency of the virus, such that proposed remedies should be progressively imaginative. The scientific community must not at any point in time give up on reviewing the genomic changes of the virus. To forge ahead in the face of respiratory viruses' threat demands constant assessment of the disease causing vectors. Hence, process philosophy urges us that while we seek solution to the novel Covid-19, we should, however be on the watch out for future threats, taking into consideration the creative nature of entities of all kinds in the world of creativity and interconnectedness. Thus, process philosophy urges us that while we seek to recover from the pandemic, we must also plan ahead, for without such foresight, the future of respiratory diseases caused by coronaviruses may be bleak.

CONCLUSION

Creativity, progress and interconnectedness characterize entities in the world, be it plants, animals and pathogens. The novel Covid-19 shows what could be the fate of man in the world when he stops thinking of events as continuously unfolding. We must, therefore, embrace the bitter reality that Coronaviruses disease is and will always be a threat to humanity, it has come to stay and will always resurface when we least expected. However, it is our position that even when it tends to disappear, the scientific community should be found wanting in carrying out further researches on the virus in order to ascertain its level of strength and so as to develop measures commensurable with its evolutionary level.

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