SOME THOUGHTS ON THE CORONA PANDEMIC

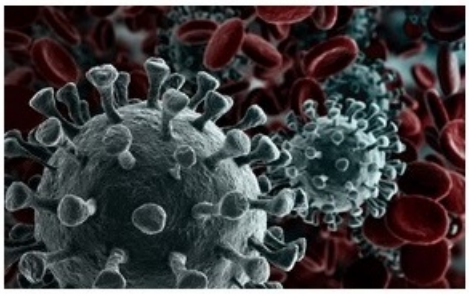
Although the public and the US Government was little concerned when China announced back on Dec.31, 2019 that its citizens in the town of Wutan where becoming sick and dying from a new flu like virus now known as the Corona Virus. Within a few weeks after this announcement the virus was being found all over the world despite of attempts at travel restrictions and patient isolation. At the moment (March 9) there have been some 125,000 cases publically announced throughout the world with approximately 5000 deaths involving all age groups. This morning the WHO finally declared the Corona Virus a world-wide pandemic. At the moment Italy, South-Korea, and Iran in addition to China have declared the largest number of Corona infections although one expects this to shortly extend to other countries. What is particularly troubling about this pulmonary infection is there will be no vaccine available for at least a year. At that time the pandemic will be over but the worldwide damage of several million deaths will have been done. The death rate for individuals infected by the Corona Virus is believed to be about 1% to 3%.

It is our purpose in this article to (1) estimate the total number of Corona Virus cases to be expected and the number of death resulting throughout the world, (2) discuss the expected duration of this pandemic based on a comparison with the 1918 Spanish Flu, and (3) briefly mention the negative economic consequences of this pandemic such as stock losses , unemployment , and social unrest which will follow.

Let us begin by looking at the culprit of the present discussion. It is a new strain of flu like virus termed the Corona Virus. An electron micrograph of it looks as follows-

Electron-Micrograph-Coronavirus

(source-Shutterstock)



It has the shape of small spheres of about 100 nano-meter diameter with golf-ball holder like protrusions set perpendicular to the surface. The virus uses one of these protrusions to dissolve a small hole into a living cell wall and then transfers its DNA through this hole to the cell inside where it multiplies and then explodes the infected cell to continue its reproduction process with an ever increasing number of viruses (chain reaction).In

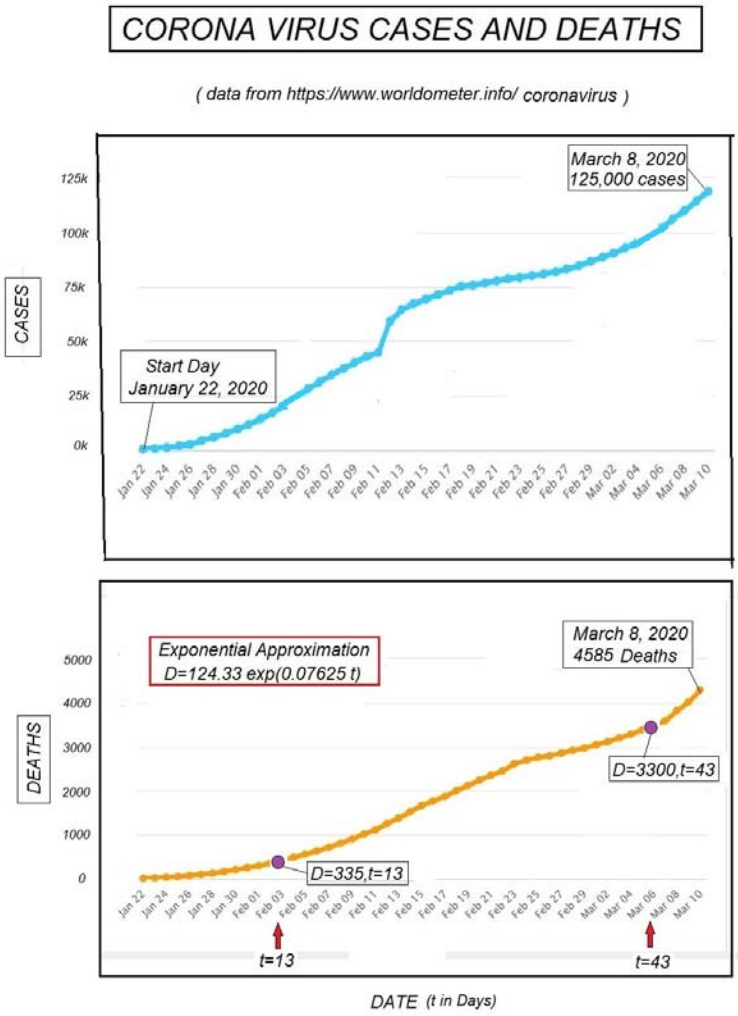
most instances the body's immune system will destroy these newly formed viruses. Unfortunately with intense virus attacks the bodies immune system sometimes responds too vigorously causing an oversupply of fluid along the upper respiratory tract of the lung . This prevents the O2-CO2 interchange from functioning. The result is suffocation affecting about 2% of all individuals with the disease.

Although the Corona Virus has a relatively low mortality rate for a given individual, its ability to quickly infect other individuals makes it a formidable foe. Actually looking from the viruses' point of you, it is well adapted to survive and multiply. If its kill rate would be much higher it would kill its host and thus making transmission to other hosts less likely.

We next come to the most sought after question concerning the Corona Virus. How large will the death rate be and what will be its duration? We now have 40 plus days of data available concerning the number of infections which have occurred and the accompanying deaths, A good source for this information is found at-

https://www.worldometer.info/coronavirus/

I have modified one of their graphs which show infections and deaths over a 45 day period starting on January 22, 2020, which I have designated as day one-



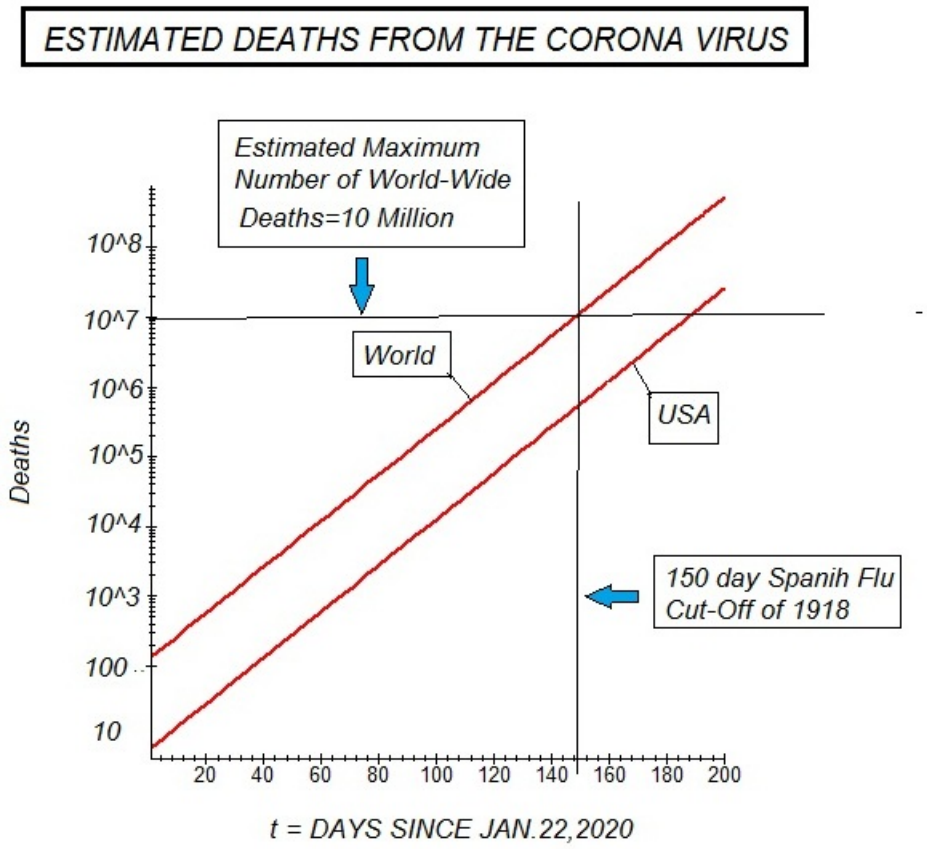
As expected, both the number of infections and the number of deaths move up rapidly in time. However the number of deaths eventually exceed the number of cases. Since this cannot be, it suggests that the number of infections are being underreported. However the death rate numbers should be correct. Since the deaths are probably reported accurately and the fact that initially expansions usually grow exponentially, it seems reasonable that the red curve above is trying to approximate the exponential form-

$$D=Aexp(Bt)$$

, where A an B are constants recoverable by looking at two points along the D=D(t) curve. Using [D,t]=[335,13] and [3300,43] we find A and B and the exponential curve-

$$D=124.33\ exp(0.07625\ t)$$

Remember that t represents the days after t=1 which occurs on Jan.22, 2020. Plotting this formula as a semi-logplot we get the straight line result shown-



It suggests that there will be ten million deaths due to the Corona Virus at day t=148, which puts us at the end of July. If this number will actually be reached is questionable since one knows from the Spanish Flue of 1918 that it lasted a little less than one year(see . https://www.nytimes.com/2020/03/09/health/coronavirus-is-very-different-from-the-spanish-flu-of-1918-heres-how.html). So the vertical black line on the graph above puts a limit on these expected deaths. Also assuming an evenly distributed density of infections throughout the world and knowing the United States makes up 1/20th of the world population, we expect the death rate in the USA to not reach more than one-half million. That is still a large number and will cause major economic upheavals.

The economic effects I see coming include a major stock market collapse which is already underway, shakeup of the world financial systems, rapidly rising unemployment, inability to repay loans , falling commodity prices (including real estate, gold, art, etc) and difficulty starting new businesses. I have read through the years what happened when a large parts of the globe underwent previous plagues, especially during Roman times and for the bubonic plague(black death) of the 13th hundreds in western medieval Europe. It took Europe an entire generation to recover from that plague which caused those countries to loose about a third of their population. Recovery from the 1918 Spanish Flu,

during which an estimated 20 million deaths occurred, was rather rapid leading to the Roaring Twenties.

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