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**Corona: A Death We Knew Was
Coming**
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Chapter I: The Chinese Phase

Missed Opportunities (January/February)

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The Nobel Prize-winning molecular biologist Joshua Leder once wrote: 'The single biggest threat to man's continued dominance on the planet is the virus. They are looking for food; we are their meat.' That's all you need to know, to understand what's been happening on Earth these last few months. Humans have been dying from viruses for as long as the human race has existed – despite the fact we couldn't see them until we'd invented the electron microscope, which makes the invisible visible.

US President Donald Trump calls the new coronavirus 'the invisible enemy', to justify his failings. Yet virologists can make it visible, which is why we can gaze upon the intruder – cutting a slightly ludicrous figure, like an extra-terrestrial chestnut – every day on the evening news.

'We are at war,' says French President Emmanuel Macron – but he, too, is wrong. So far we've only been able to defend ourselves by running away or hiding in our homes. We are no soldiers, we're all civilians – and it's the oldest and weakest who are dying at the front.

...]

German Chancellor Angela Merkel prophesied that '60 percent of the [German] population could become infected', wanting to allay our fears by spreading the message that 'we won't be beaten'. Yet in the twentieth century more people died from viruses than died in total as a result of war, and there are an estimated 700,000 or so mammal and bird viruses that could be passed on to humans, of which 260 have done so already – including polio, AIDS, dengue fever, measles, Ebola, SARS and H5N1 avian flu.

When the British Prime Minister Boris Johnson visited a hospital and held out his hand to virus patients, it was his way of saying: 'Come on, keep shaking hands – it's not as bad as all that.' Four weeks later he was in intensive care, fighting for his life. Well, you can make things easy for the virus – or as difficult as possible.

Scientists around the world are only beginning to get to grips with SARS-CoV-2. As of the middle of May, the online database GISAID 23.363 was still receiving different SARS-CoV-2 viral sequences from all over the world. The virologists' investigations have only just started. [...]

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30 December 2019, Wuhan, China

Late in the afternoon on 30 December, the ophthalmologist Li Wenliang posts a short message on WeChat. Little does he know the trouble these few lines will get him into, or that he is making history – as a whistleblower and a folk hero. Dr Li Wenliang is 34 years old; friends describe him as a cheerful man, who likes an occasional beer in the evening, but rarely more than one, and has a penchant for fried chicken, which

he often buys at 'Dicos', at the train station. At weekends he plays badminton – enthusiastically, if not very well. What Li Wenliang doesn't know on this afternoon of 30 December is that he doesn't have much time left.

Li works in the eye centre at the Houhu district hospital in Gusaoshu Road, an offshoot of Wuhan Central Hospital. He is one of around 20 doctors employed there. Li's message is received by 150 or so WeChat members – former fellow students, most of whom are now doctors. It reads: 'There are 7 confirmed cases of SARS at Huanan seafood market... They are being isolated in the emergency department of our Houhu district hospital.' An hour later, he adds: 'It has been confirmed that they are coronavirus infections... Don't circulate the information outside this group. Tell your family and loved ones to take precautions.' He attaches a photo of the lab report to the message – a report he wasn't supposed to have seen.

How did Li find out about those seven cases? Probably in a roundabout way. The eye centre is a small, self-contained world; it has little to do with the comparatively hectic A&E department in the main building, except perhaps when someone sustains eye injuries in an accident and is referred to the centre by A&E. The head of A&E is Ai Fen. She and Li don't know each other personally, but a coincidence brings them together that day: the information that Li passes on, and which will change his life, has come from Ai Fen.

Something has caught Dr Ai Fen's eye: during the past ten days or so, a growing number of patients has presented with unusual lung and respiratory problems. A week ago, they performed a bronchoscopy on one of them, extracted some fluid and sent it off for genetic sequencing to the BioCapital labs in Beijing. Ai Fen had received the lab report that morning. She read it several times. The *Guardian* later reports that she picks up a red pen, circles the words 'SARS coronavirus' and sends a photo of it to a colleague and friend. She also posts it to her department message board, to alert the others, and passes the information on to the hospital's infectious diseases department and Wuhan's health authorities. She communicates only through official channels – she doesn't go public.

'SARS coronavirus' is an ominous phrase – two words as loud as a wailing siren. SARS is the 'severe acute respiratory syndrome' that was triggered by a coronavirus in 2002 and cost 800 lives. Scientists and governments knew that the SARS epidemic was a warning: if they wanted to be better prepared for such viral outbreaks in future they would have to develop vaccines, and plans for dealing with a coronavirus pandemic. Similar warnings were issued repeatedly during the next 16 years, right up to December 2019.

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The First Warning

In July 2003, the science journal Nature publishes an in-depth analysis of the recent SARS epidemic. 'Are we ready for another such outbreak?' the scientists ask. As far as our ability to analyse a virus is concerned, they say the answer is yes; but as far as health authorities are concerned, it's a clear no. Most countries are worryingly underprepared for a SARS-like flu pandemic.

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30 December, Wuhan, China

Dr Ai Fen hasn't sent the message to Dr Li, but he hears about it anyway that afternoon, in the hospital corridor, from the public address system. Li is no virologist or epidemiologist, but he alerts his former fellow students and friends. He is the one who informs people about the virus, information which, as he later reveals, the police tried to suppress.

In an interview with the Chinese magazine *Renwu*, Dr Ai Fen insists that she was no whistleblower, and says it with bitterness and regret. She merely provided the whistle, while others had done the blowing – in particular Li Wenliang, she says, with admiration.

By the time that Li alerts his friends and colleagues to the large number of new patients suffering from a mysterious virus, the state health authorities have long been in possession of this information. They've known about these patients ever since the middle of November – the *South China Post* later reports that the first patient was most likely confirmed on 17 November. Drawing on government sources, the paper says that, from that date on, between one and five new cases were registered daily. Other doctors besides Ai Fen have also told the health authorities.

So the Chinese Centre for Disease Control and Prevention knows about it, as no doubt do the top officials within Wuhan's security apparatus, the police and the mayor's office. One can imagine the discussions, evaluations and hesitation taking place behind those closed doors. Where has the virus come from? Is it new? How dangerous is it? What should they – Wuhan's party chief, police chief, mayor – do now?

China's system for registering infectious diseases is highly organised. Ever since the SARS crisis, clinics have been required to immediately report any suspicious cases. Now, however, the system fails. In early January, labs analysing samples from infected patients receive a phone call from the Hubei province health authorities, ordering them to cease testing. Reporters from the newspaper *Caixin* have discovered that a directive to that effect also came from the very top, from China's National Health Commission (NHC). It takes another three weeks for the authorities to admit that they are dealing with a virus, and that it's transmitted from human to human. [...]

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The Second Warning

In 2006, the US epidemiologist Larry Brilliant reports that a poll among leading epidemiologists has found that 90 percent expect a pandemic during their children's or grandchildren's lifetime. So the question is not if, but when. Larry Brilliant, who once helped to eradicate smallpox, warns of a pandemic, and predicts both a worldwide recession and the collapse of the global just-in-time supply chain.

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30 December, Wuhan, China

Despite the gagging order, the news leaks out. On the evening of 30 December, the health authorities post a notice online, urging hospitals to report any further cases of 'viral pneumonia of unknown cause'. A screenshot of the message circulates on social media, and the next morning the screenshot is emailed among others to Yu Liping, a young journalist based in Beijing. At that point, it would still have been possible

to prevent the spread of the virus, or at least to contain it better. According to one international study, the number of infections would have been around 66 percent lower if the city of Wuhan had gone into lockdown sooner; had they taken appropriate measures right at the start of January, the number would probably be around 95 percent lower.

But somewhere in Wuhan's party and security apparatus they take the decision to wait and see – to collect and pass on data, and keep an eye on the situation. The censorship machine kicks in, and WeChat servers and the Chinese streaming service YY flag key words for censoring. The population must not be informed, and any unrest or uncomfortable questions are to be avoided.

And so the virus is given three deadly weeks.

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30 December, Beijing, China

On the day that Dr Li Wenliang posts his brief warning of a mysterious illness on WeChat in Wuhan, Yu Liping is sitting about 650 miles away in her room in the small flat she shares with a friend in Beijing. Liping (a pseudonym) is a 29-year-old journalist. She later describes over the phone and via email how the virus proceeded to change her life over the following days and weeks. She has just quit her last job, but isn't worried; she has some money saved up, and women with skills like hers are much sought after on the Beijing job market.

Liping is a literature graduate, and speaks and writes excellent English. Her parents are both academics living in Wuhan, where Liping grew up. She likes her home town, and her district, the old seafood and wild animal market, but prefers living in Beijing. For the past three years she worked for a press agency, reporting on cultural, business and lifestyle topics. Her salary wasn't bad – roughly 11,500 renbi (£1,300 / \$1,600) a month, higher than average for Beijing. [...]

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The Third Warning

At the end of 2012, the Robert Koch Institute in Berlin models the outbreak of a fictional coronavirus called 'Modi-SARS'. It's highly contagious, and particularly dangerous for the elderly – and there's no cure. Among other things, the simulation describes how infection occurs in several waves: when there's a large number of victims, people are more careful and keep their distance; as the number falls, they become careless again.

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31 December, Taipei, Taiwan

The global fight against the as yet unnamed virus begins in Taiwan. It's 5 a.m., and the deputy head of Taiwan's Centre for Disease Control is already up. He'd accidentally set his alarm too early, he later tells a press conference, so he scrolls through a post on the Professional Technology Temple discussion forum.

‘SARS’: when he spots the word in a post from 2:24 a.m., the deputy head stops in his tracks. A user with the handle ‘nomorepipe’ has shared the alert sent out by Wuhan’s health authorities, regarding those unexplained lung infections – as well as a screenshot of the WeChat posts in which Li Wenliang reports at least seven patients in isolation and erroneously suspects the familiar SARS virus. The CDC man forwards the message to his colleagues. The mention of SARS sets alarm bells ringing – and for good reason. Taiwan was hit by SARS in 2003; left to its own devices, without any help from the WHO, it was panicked by the outbreak, in which more than 70 people died. In the aftermath, Taiwan completely overhauled its infection prevention system. In 2017 – as the new president, Tsai Ing-wen, was seeking to distance the country from China – China refused to invite Taiwan to join the World Health Assembly as an observer, a status that had been granted to Taiwan every year since 2009. Taiwan is now no longer part of the global fight against infectious diseases, and can only get hold of information via a circuitous route.

The democratic island state, located just 100 miles from China’s south-east coast, immediately raises the alarm. As it turns out, Taiwan succeeds better than almost any other country in overcoming the epidemic, while at the same time battling against being ignored and sabotaged by China and the WHO – not least because many countries don’t recognise Taiwan as an independent state.

As soon as the alarm is raised, Taiwan goes into action. In the morning, Taiwan’s experts email their colleagues in China, and at lunchtime they also send an email to the WHO. They plead for more information, and mention that Wuhan has patients in isolation. Taiwan later insists that this was a clear indicator of human-to-human transmission – at a time when China was still denying the fact. The WHO sends a confirmation of receipt, but never publicly comments on the message. It isn’t until March that Taiwan itself makes it public. The island state doesn’t lose any time: on 31 December, officials board planes arriving from Wuhan right after landing, and check passengers for symptoms. [...]

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1 January, Wuhan, China

The previous day, on 31 December, the authorities ordered the Huanan Seafood Wholesale Market to be closed and disinfected. The officials wore white protective suits, suggesting that the authorities were aware of the danger. Many of the carcasses are destroyed, which is a mistake: they could have provided valuable clues. In the meantime China, too, has informed the WHO and Hong Kong.

To call it the ‘Huanan Seafood Wholesale Market’ doesn’t quite do it justice: it’s a massive area covering an estimated 5,400 square feet – the size of twelve football pitches – with two large halls separated by a wide thoroughfare. There are more than a thousand stalls, and seafood isn’t the only thing they sell here: in the narrow, sometimes slippery alleyways you can buy meat and wild animals, too, live animals in cages and nets, alongside butcher’s meat, carcasses and snake ragout, dachshund fillets, all sorts of birds, rodents, salamanders, camel meat, toads, wolf cubs, bamboo rats – the list is long. And under the counter, insiders say, you could even purchase deep-fried bats and bat-bones ground into a powder, highly prized as a cure for various illnesses. You could also buy bat excrement – the faeces of the horseshoe bat are often used to treat eye disease, or mixed with wine and drunk to ‘detoxify’ the body. Even now, after the outbreak of the pandemic, you can still order bat faeces online, for \$12.38 per 100g.

At 11:46 p.m., Dr Ai Fen receives a message from the head of the hospital disciplinary board: she's ordered to attend a review the following day. In the meantime, in addition to censoring communications, Wuhan's security bureau has issued a warning that 'false information' about a new lung infection is circling on the internet; it says that it's investigating eight people who have concocted or shared these malicious rumours, and refers in threatening terms to 'illegal actions' disrupting the 'harmonious cyberspace'. [...]

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The Fourth Warning

In March 2015, Microsoft founder Bill Gates speaks at a TED conference in Vancouver. He tells the audience: 'If anything kills over 10 million people over the next few decades, it is likely to be a highly infectious virus rather than war.' He criticises the lack of coordination between doctors and researchers, and demands an almost military logistics: 'The world needs to prepare for pandemics the way the military prepares for war.'

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3 January, Berlin, Germany

Shortly after New Year's Eve, the virus invades Olfert Landt's life. Landt is a 54-year-old biochemist with greying hair, which he wears in a ponytail. He started out on his own while still a student, founding the small firm TIB Molbiol, whose labs are located in an old red-brick building in Berlin's Tempelhof district. That was 30 years ago, and since then, he tells us over the phone, he has sent pathogen diagnostic kits all over the world: whether it's bird flu, swine flu, SARS, or the Alkhurma virus reported mainly in Saudi Arabia – Landt is interested in everything that makes you ill. The moment he hears about a new virus, he starts researching it. Landt works quickly and thoroughly, as does his team. They're often among the first to produce a test for a new virus, such as during the 2003 SARS epidemic, the 2006 bird flu epidemic and the 2009 swine flu epidemic. He very often works with virologists like Christian Drosten, the director of the Virology Institute at the Berlin Charité hospital.

On this day in January, Landt is sitting in Drosten's office. The two men have known each other a long time. They have worked together on many small research projects in Africa, South America and elsewhere over the years, conducting local studies and trying to help the relevant countries to quickly progress their diagnostic processes. And now Landt has heard on the news that there's a mysterious disease spreading in China. Drosten has seen the reports too, according to which 42 people have fallen ill in a Wuhan seafood market.

One person has died, but as far as Landt knows the man in question had been suffering from an underlying condition – not unusual in cases of infection. The reports are also seven days old, and there's no news of further infections. Landt therefore assumes that the victims simply caught something at this seafood market in Wuhan, and that the others will recover at some point.

Drosten already received unofficial news of the virus from researchers in China during the last week of 2019. It isn't clear yet precisely what kind of pathogen is involved; but Drosten is an experienced virologist and renowned coronavirus expert – and that's exactly what he surmises the Chinese are dealing with: a new strain of coronavirus. He tells Deutschlandfunk radio that social media reports suggest it might be a virus

similar to SARS. He puts two and two together and searches the Charité hospital's database, where key data on the genome structure of other coronaviruses is stored. Drosten and his team utilise the sequence data to create their first virtual models for a diagnostic test, using what little information they have on the virus.

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3 January, Atlanta (GA), USA

The US Center for Disease Control and Prevention (CDC) has known about the new virus for several days. The director receives a call from a colleague in China, who provides him with further details about the unusual lung disease. According to the *Washington Post*, the CDC chief informs the secretary of state for health, who informs the White House. Three days later, the CDC director asks Beijing for permission to send scientists to Wuhan and, among other things, take a sample of the virus. The Chinese authorities turn down his request. As late as 14 January, they insist that there is 'no clear evidence of human-to-human transmission'. [...]

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3 January, Wuhan, China

The ophthalmologist Li Wenliang lives with his family in Shangmao Road, which comes under the jurisdiction of Wuhan's Zhongnan Road Police Station. They summon Li to the station.

The caution and disciplinary lecture are delivered by a training officer. She accuses the ophthalmologist of disrupting social order by spreading false rumours, and demands that he immediately ceases all illegal activity. He is asked whether he's willing to do that. Li has to obediently reply in the affirmative, and his reply is noted. Has he understood that any further activities of the kind will be punished? Li has to confirm it in writing; he puts two characters at the bottom of the document: *mingbai*, 'understood'. He has to sign the document with his fingerprints, in red ink. Then he's allowed to go home.

The tone and procedure are harsh even by Chinese standards; the authorities clearly don't want people to start talking, and all public events are to take place as planned. The Chinese New Year, China's most important public holiday, is just around the corner; and to celebrate the incoming Year of the Rat, a vast banquet – the 'Banquet of 10,000 Families' – has been scheduled for 19 January, with 40,000 attendees, 14,000 dishes, dragon dancers, and entertainments during the interludes.

Li's friends later reveal that he was so intimidated by what happened that he didn't mention it to his wife. His fellow medic, Ai Fen – the head of A&E – is also cowed into silence. All related information is quickly removed from the web by the Chinese authorities, while algorithms search for suspicious key words; but screenshots keep turning up, people keep remembering.

During the coming days Li remains afraid and keeps quiet, and declines to wear a mask. And then, at some point – perhaps during a patient's eye examination – it happens: the new virus finds a way into the ophthalmologist's body, where it immediately sets its programme in motion.

The invader is so small that it remains invisible even through an optical microscope. It's maybe about 150 nanometres in diameter, which makes it 1/100th–1/1,000th the size of a normal cell in the human body. To



give you an idea of its size: a nanometre is a millionth of a millimetre. This pathogen isn't even a proper living organism, but a long chain of adaptive genetic material stored in the shape of a single coiled strand of ribonucleic acid, surrounded by a fatty membrane, on which sit certain proteins that stick out of the virus's shell like spikes.

Seen through an electron microscope, the virus almost looks cute: like a circle into which someone has stuck short little rods. Like a child's drawing of a sun.

The virus needs nothing else in order to spread. It can do both nothing and everything: nothing, because a virus – unlike, for example, bacteria – doesn't have its own metabolic process and no cell components, and it can't synthesise protein of its own accord; but at the same time it can do everything, because with the help of its host it passes on its own genetic code with maximum efficiency, and its effect can be devastating: viruses cause diseases that needn't be deadly – such as herpes or the common cold – but can be.

Li Wenliang is yet to feel any of it. For now, he feels nothing. He doesn't notice the virus travelling from his nasopharyngeal cavity deep down into the mucous membranes in his lungs, or how it rapidly multiplies in his throat and lungs, capturing one cell after another. At this point, there are no symptoms. They'll only appear a few days later. In the meantime, inside his body, the young doctor's immune system begins its battle against the virus. And Li Wenliang will infect others without knowing it; because during this phase, before the first symptoms show up, he is particularly infectious.