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## **IT ALL BEGAN IN CHINA**

**BY BARRY COOPER  
AND MARCO NAVARRO-GÉNIE**



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# All warfare is based on deception.

**Sun Tsu,**  
*The Art of War, I: 18*

## THE BEGINNING

Timelines associated with the spread of COVID-19 have changed over the past year and, with new information, may change again in the future. There seems to be widespread agreement in publicly available sources that individuals with odd flu-like illnesses were observed in China as early as August 2019. Nothing was publicly confirmed until a 70-year-old man with Alzheimer's disease was diagnosed in late December 2019 in Wuhan. According to the *Lancet*, which, despite recent irregularities, remains a flagship English-language general medical journal, the symptoms of this first patient presented around December 1.<sup>1</sup> There also seems to be agreement that by late 2019 the "novel" coronavirus had jumped from an animal to a human being; this is called a zoonotic transmission. At this point, narrative agreement breaks down. Some observers said the transmission from an unspecified animal to a human took place in the Huanan Wholesale Seafood Market, also in Wuhan. It was called a "wet" market not simply because it sold slaughtered live seafood that requires water to live. It was also the site of the live slaughter of pangolins, wolf pups, hares, Sika deer, rabbits, bamboo rats, hedgehogs, snakes, raccoons, dogs, porcupines, badgers, pigs, salamanders (regular and giant), two types of crocodiles, geese, ducks, doves, chickens, and peacocks.<sup>2</sup>

A second narrative began with the infection of the wife of the patient with Alzheimer's who showed symptoms of pneumonia at the end of the first week in December but who had no known history of exposure to the Wuhan wet market. She was then hospitalized in an isolation ward. Some observers then turned their attention to the Wuhan Institute of Virology, some 12 kilometers away from the market.

Others looked at the even closer (280 meters) Wuhan Centre for Disease Control and Prevention. The Wuhan virology lab, which happens to have close ties to the National Microbiology Laboratory in Winnipeg,<sup>3</sup> was built by a contractor for the People's Liberation Army (PLA) and is associated with the Academy of Military Medical Sciences. Evidently, the PLA sponsored research and experiments in genetic editing, human performance enhancement, and similar bioweapons work.<sup>4</sup> It was intended to be a top-level security laboratory (as well as a top-secret one) that would be capable of safely handling the most deadly human pathogens. The Chinese certified that it met Biosafety Level Four (BSL-4), the highest safety rating available, but many scientists outside China viewed that classification skeptically. In 2017, an article in *Nature* raised questions about the safety protocols in Chinese microbiology labs, adding historical weight to the possibility, raised early in the history of the pandemic, that the virus may have escaped from the Wuhan Institute of Virology into the human population that frequented the market.<sup>5</sup>

In January 2018, the United States sent scientists with diplomatic status to visit the Wuhan virology lab. They discovered that SARS-like coronaviruses from bats could interact with the human receptor found in the lungs, called ACE2, which "strongly suggests that SARS-like coronaviruses from bats can be transmitted to humans to cause SARS-like diseases."<sup>6</sup> The Americans also found that the lab personnel did not follow or practice BSL-4 security protocols but were closer to BSL-2.

The Institute of Virology was controversial for another reason. Virologist Shi Zhengli was nicknamed the "bat lady" for directing a team that had accumulated an extensive collection of coronaviruses from bat caves of southern China.<sup>7</sup> She has also conducted experiments on bat viruses "to find out how

they might mutate to become more infectious to humans."<sup>8</sup> These experiments are called "gain-of-function" or GoF experiments. As the name implies, they are intended to generate viruses with novel properties that may be more pathogenic and/or transmissible than wild viruses or even to generate viruses with attributes that do not exist in nature.<sup>9</sup> Despite being routinely used, it would be an understatement to say such experimentation is controversial.<sup>10</sup> For that reason, the United States has banned GoF experiments from time to time and they have not been conducted in the Winnipeg lab. They were reinstated in the U.S. on December 19, 2017, after having been discontinued there since October 2014.<sup>11</sup>

Shi provided a different account.<sup>12</sup> For context, two matters should be borne in mind. First, the Wuhan Institute of Virology has been studying bats and bat diseases for a quarter-century. At the time, they were concerned with discovering the origins of SARS-1 or SARS-CoV-1. It turned out that the cross-species infection from bats to humans was discovered relatively early. The Chinese scientists eventually traced the origin of the SARS-1 virus to a cave in Yunnan province, over 1,200 kilometers south of Wuhan. The nearest relative to SARS-CoV-2 is also a coronavirus that the Wuhan lab isolated from a horseshoe bat found in Yunnan in 2013.<sup>13</sup> This virus, then called RaTG13, shared 96.4 percent of its genome with SARS-CoV-2. The 3.8 percent of genetic difference is equivalent to between twenty and fifty years of natural evolutionary change. But, as we shall see, that is not the whole story. In any event, how a bat in Yunnan led to an infection in Wuhan has yet to be definitively accounted for.

The second contextual factor is the adversarial geopolitical relationship between the United States and China. For example, Shi said that then-president Donald Trump "owed us an apology" for suggesting that SARS-CoV-2

escaped from the Wuhan lab.<sup>14</sup>

On July 15, 2020, Shi emailed *Science* with a reply to a series of written questions (a link is available in the *Science* article in the previous footnote). When asked if a bat “in or close to Wuhan” might have infected someone, she said that she favoured the theory that the virus spread through an intermediate host. This became the standard, orthodox, oft-repeated Chinese narrative. She did not suggest what that host might be, but others have mentioned pangolins, which are found in southern China, are also smuggled into China from Southeast Asia, and are sold for food and traditional medicine in the Wuhan wet market.<sup>15</sup> Nor did she indicate whether any zoonotic transmission took place in Wuhan or elsewhere. She did, however, repeat the observation of an Australian expert on virus evolution noted above, that the divergence in genome sequence between SARS-CoV-2 and RaTG13 was between twenty and fifty years of natural evolution.

However, as just noted, that was not the whole story. Both Shi and the American Defense Intelligence Agency (ADIA) said that the SARS-CoV-2 virus was not genetically engineered. The Americans also said that there was “no credible evidence” that the virus was intentionally released as a biological weapon.<sup>16</sup> Even if the Wuhan lab was given the benefit of the doubt, it was capable of conducting cut-and-paste genetic engineering experiments and evidently, in 2015, took a piece of SARS-1 virus and replaced it with a piece from a SARS-like bat virus to make it infectious for humans. However, such recombinant DNA changes are easily detectable, “like a contemporary addition to an old Victorian house,” to use a *Newsweek* image. The Americans’ conclusion that it was not intentionally released is, obviously, speculative: that there was no evidence of such an action is not evidence of the absence of action. That the Chinese

denied doing so was entirely to be expected. What matters in this context is capability, not a focus on accidents or intentions.

There remains yet another problem: about a third of the original cluster of Wuhan cases had no exposure to the wet market, which meant that COVID-19 was already spreading through inter-human contact in December 2019, at the latest. Here is where the circumstantial evidence regarding the Wuhan Institute of Virology needs to be considered. First, as part of an international program, partly funded by the United States, the Institute had been undertaking GoF research, as had many other places.<sup>17</sup> As noted, such research is routine but controversial and dangerous, especially when conducted in labs with less than stellar safety records, including those in the U.S.<sup>18</sup>

One explanation involves the technique used in GoF experiments often called “serial animal passage.” In 2010, a Dutch virologist, Ron Fouchier, was working on a flu virus called H5N1. It was mainly transmitted by humans handling infected birds and was often lethal. Fouchier wondered what it would take to change H5N1 into a virus more easily transmissible among humans and conducted his GoF experiment using ferrets, not cell cultures, to mutate H5N1. Ferrets are, with respect to viruses, genetically close enough to humans so that if a mutated H5N1 virus could be transmitted between infected and uninfected ferrets, the same thing would likely be possible between humans. The mutation occurs naturally in the ferret’s body: infect the first animal with pure H5N1, wait till it gets sick, and then infect a second one with a nasal swab, then a third, and so on. With each iteration, the genetic content of the virus is slightly changed. After the tenth iteration of the animal passage, Fouchier observed that an infected animal could transmit the virus to another one in an adjoining cage and not through a direct swab. Animal-passage

techniques employed in a GoF experiment, again to state the obvious, can eventually produce a novel and, for that reason alone, a dangerous virus.<sup>19</sup> In the late 1970s, for example, the Soviet Union artificially created the H1N1 swine flu virus in this manner. It then escaped from a Soviet lab.<sup>20</sup>

Fouchier claimed the GoF experiment was essential to demonstrate causal relations among genes, mutations, and disease, and so it was useful for the preparation of future antiviral medicines. But “the next pandemic itself could be caused by those experiments, due to the risk of lab escape.”<sup>21</sup> The main point, however, is that, as noted, by 2020 animal-passage GoF experiments had become both widespread and routine; most were conducted in BSL-4 labs, though Fouchier’s was rated at BSL-2. According to Colin Carlson, an expert in emerging infectious diseases at Georgetown University, such GoF experiments helped virologists isolate and classify SARS-CoV-2 shortly after it appeared.<sup>22</sup> Others, notably Richard Ebright at Rutgers, disagreed. Granted, serial animal-passage GoF experiments, like so many other technical activities, have dual uses. In terms of the accumulation of circumstantial evidence of such GoF activity in the Wuhan lab, however, the important thing is that, compared to cut-and-paste genetic engineering, animal passage experiments are much more difficult to detect. To revert to the *Newsweek* image, they are like new Victorian replica additions to an old Victorian house.

In other words, serial animal passage “forces zoonosis between species and requires the same molecular adaptation necessary for a natural zoonotic jump to occur within a laboratory, leaving the same genetic signatures behind as a natural jump but occurring in a much shorter period of time.” The creation of artificial evolutionary generations by way of forced serial passage

“created the artificial appearance of evolutionary distance” as took place in the Soviet swine flu experiments. This same evolutionary distance is characteristic of SARS-CoV-2 “which is distant enough from any other virus that it has been placed in its own clade” or evolutionary category.<sup>23</sup> Segreto and Deigin thus suggested that SARS-CoV-2 “could have been synthesized” using pangolins as GoF intermediaries. The Chinese, however, did not publish the results, either because of the COVID-19 outbreak or because “the results were never intended to be published.” Either way, “an artificial origin of SARS-CoV-2 is not a baseless conspiracy theory.” This was speculative, of course, but the authors insisted it was a reasonable speculation.<sup>24</sup>

In short, the structure of animal-passage techniques means that the results are often indistinguishable from the evolution of a virus in the wild. A bat-sourced coronavirus passing through ten ferrets would be difficult, to say the least, to distinguish from a naturally evolved one. It’s possible that the Wuhan lab never undertook animal-passage GoF experiments, though this seems highly unlikely. More credible is the notion that such experiments were routinely but secretly conducted. Perhaps more politically interesting, because it was acceptable to the Chinese, is another interpretation. Kristian Andersen et al., of Scripps Research, published a widely cited account in *Nature Medicine* that argued “that SARS-CoV-2 is not a laboratory construct of purposefully manipulated virus.”<sup>25</sup> The authors went on to discuss “two scenarios that can plausibly explain the origin of SARS-CoV-2.” The second, natural selection in humans following a zoonotic transfer, is less significant than natural selection from an animal host prior to a zoonotic transfer.

## SARS-COV-2 WAS PERFECTLY ADAPTED TO INFECT HUMANS

The authors did admit that “in theory, it is possible that SARS-CoV-2 acquired ... mutations ... during adaptation to passage in cell culture,” but the evidence of SARS-CoV-2-like viruses in pangolins “provided a much stronger and more parsimonious explanation” of how SARS-CoV-2 acquired its new transmissibility features, namely inter-human infection. The authors did not consider the possibility of animal passage in a laboratory such as the Wuhan Institute of Virology. But as Ebright noted in an email to *Newsweek*, and as we have just argued, mutation in a laboratory using animal-passage GoF techniques and human intervention is “identical apart from location” from the more benevolent wild “pangolin-passage” scenarios.<sup>26</sup> Ebright thus concluded that Andersen’s reasoning in favour of a natural origin was “unsound” because there was no reason to favour wild-pangolin over other laboratory-based animal-passage events. We agree.

There is another factor to consider as well. We noted above that in 2018 American scientists in China discovered that SARS-like coronaviruses could interact directly with a human receptor, ACE2, an enzyme found in human lungs, among other places. This was important because the “binding affinity” of SARS-CoV-2 in humans “raises additional questions about its initial emergence.” Specifically, “the novel coronavirus appears to be far more adapted to human ACE2 receptors than those found in bats, which is unexpected given that bats are the virus’s assumed source.” This peculiarity “led the lead research[ers] to observe that SARS-CoV-2 was perfectly adapted to infect humans since its first contact with us, and had no apparent need for any adaptive evolution at all.” That

is, “SARS-CoV-2 appeared just as adapted to humans at the very start of its epidemic as SARS-CoV was in the latest stages of its emergency, an unexpected finding since viruses are expected to mutate substantially as they acclimate to a new species.”<sup>27</sup>

So, what are we to make of this “unexpected finding?” As early as May 2020, Nikolai Petrovsky, an immunologist at the University of Adelaide, said: “coronavirus is so perfectly adapted to infect humans that theories of its origin in a viral lab in Wuhan cannot be ignored.”<sup>28</sup> A later report reiterated Petrovsky’s observation in more colourful language. SARS-CoV-2, he said, “was surprisingly well adapted to its human prey, which is unusual for a newly emerging pathogen. ‘Holy shit, that’s really weird,’ Petrovsky recalls thinking.”<sup>29</sup> When he read the widely cited accounts in the *Lancet* (February 17, 2020) and the even more popular Andersen et al., report in *Nature Medicine*, (March 17, 2020) that dismissed the possibility of a laboratory origin of the virus as a conspiracy theory, he found the arguments “infuriating” because they were obviously untrue.

The simplified debate can be reduced to the following: on the one hand, some scientists argued that SARS-CoV-2 was not simply brought to the Wuhan Institute of Virology by bats, for example, but was engineered there since many Institute scientists “routinely perform genetic research on coronaviruses” and many have collaborated “on publications and secret projects with China’s military,” according to the American State Department fact sheet mentioned above and released by the Trump administration. Most scientists did not want to appear to agree with the Trump administration on anything, so kept quiet. As Alina Chan, a post-doc at the Broad Institute, Cambridge, Mass., explained, established scientists had lots to lose by even raising the possibility of a lab leak. She was much freer to speak her mind, and she has.



Other scientists, opposed to this position, said the virus didn't look like a genetically engineered microbe since its variation from the closest wild relative, the aforementioned RaTG13, "did not appear as discrete chunks," the way genetically engineered bits would—the modern addition to a Victorian house, to use the *Newsweek* image—but was distributed randomly throughout the viral genome. To which the pro-lab-manufactured proponents replied (and leaving the forced animal passage argument aside), SARS-CoV-2 still had one major "inexplicable feature" called a "furin cleavage site" in the spike protein that helped SARS-CoV-2 get into human cells, and these "sites" were not present in the genetically close wild viruses such as RaTG13. So where did it come from?

David Relman, a Stanford microbiologist who agreed with Petrovsky, suggested that SARS-CoV-2 may have been created from recombination with another coronavirus that did have a furin cleavage site. Petrovsky said it might have evolved within the lab and, along with some colleagues, he wrote a preprint paper for *BioRxiv* in April 2020 to present their data and argument. Then, Trump said he had evidence that the virus came from a Chinese lab, which ignited an anti-Trump media firestorm and *BioRxiv* rejected the paper, which was published elsewhere. By the late spring of 2020, the "natural origins" scientists were in control of the narrative—led by Peter Daszak, a longtime collaborator at the Wuhan Institute of Virology.<sup>30</sup>

## POLITICS AS MUCH AS SCIENCE HAS INFORMED ALL ACCOUNTS OF THE ORIGIN OF THE VIRUS

To summarize the evidence and argument so far: the Wuhan Institute of Virology was in possession of the virus RaTG13, which shared 96.4 percent of its genetic material with SARS-CoV-2. A 3.8 percent genetic divergence may provide a challenge to an animal-passage bridge, but it would be far more likely than a natural evolutionary series of mutations. Second, the denials Shi published in response to questions Cohen raised in *Science* were, as Ebright said, “formulaic, almost robotic, reiterations of statements previously made by Chinese authorities and state media.”<sup>31</sup> Accordingly, they should be given the same validity as bestowed upon Chinese authorities and state media, which is a political not a scientific question, and demands political not scientific judgment.

Indeed, it should be obvious that politics as much as science has informed all accounts of the origin of the SARS-CoV-2 virus, especially if they cast the slightest doubt on the official Chinese version. For example, on February 6, 2020, two researchers from the South China University of Technology, Botao Xiao and Lei Xiao, published a paper claiming that “the killer virus probably originated from a laboratory in Wuhan.”<sup>32</sup> The paper was soon retracted and the authors said their conclusions were “premature.” Research within China contrary to the accepted account would, under normal circumstances, quickly disappear. Whether that happened in the Botao-Lei case is not known.<sup>33</sup> In April 2020, Luc Antoine Montagnier, who received a Nobel Prize for his discovery of the HIV-AIDS

virus in 2008, also argued that SARS-CoV-2 was made in a laboratory because, he said, it was based on the HIV virus being used as a template or “backbone.” He cited the work of Prashant Pradhan and colleagues at the Kusuma School of Biological Sciences in New Delhi.<sup>34</sup> Both Montagnier and Pradhan were dismissed as being “conspiracy theorists,” a term that has been routinely employed against critics of what may be called the orthodox or mainstream narrative. By then, the Andersen et al. study in *Nature Medicine* had appeared and the notion of an engineered origin to SARS-CoV-2 was effectively debunked, though hardly disproved.

In mid-September 2020, the controversy reappeared when the *New York Post* reported that a Chinese virologist, Li-Meng Yan, had published a report arguing that SARS-CoV-2 displayed “biological characteristics that are inconsistent with a naturally occurring zoonotic virus.”<sup>35</sup> Yan had worked at the Hong Kong School of Public Health, which is associated with both the World Health Organization (WHO) and the People’s Republic of China (PRC), until April 2020. She said she fled because she feared for her safety and implied her fear was connected to work she had done in December 2019 in human-to-human transmission of the virus. The Hong Kong School of Public Health denied her claim to have conducted research on human-to-human transmission. In addition, they wiped her work from Chinese databases. Whatever one makes of Yan’s biography, the argument she made in “Unusual Features of the SARS-CoV-2 Genome” would have inevitably attracted the disapprobation of Chinese officials.

The two arguments that gave greatest support to the orthodox narrative were the Andersen et al., “natural origin” article in *Nature Medicine* and what might be called the “pangolin theory.” Yan, however, cited several critics of the Andersen et al. theory

and pointed out that at least two members of his team had been connected to, or honoured by, China. As noted above, the “natural origin” theory relied on the existence of RaTG13, but she queried whether RaTG13 actually existed in nature and whether its genetic sequence had been truthfully reported. “Therefore the theory that fabricated scientific data has been published to mislead the world’s efforts in tracing the origin of SARS-CoV-2 has become substantially convincing and it interlocked with the notion that SARS-CoV-2 is of a non-natural origin.” That was the double-edged hypothesis she defended by arguing that the genomic features of SARS-CoV-2 indicated “that the virus is a product of laboratory modification beyond what could be afforded by simple serial viral passage” using animals. In particular, she argued that a specific furin cleavage site on the SARS-CoV-2 spike protein had been fabricated as the result of genetic manipulation, and speculated that “the purpose of this manipulation could have been to assess any potential enhancement of the infectivity and pathogenicity of the laboratory-made coronavirus.” That is, it was part of a GoF experiment.

She also criticized the pangolin theory, citing recent studies published in *Nature* and other credible sources that indicated flaws in the earlier published data. The evidence and data in support of the pangolin theory, she said, “are largely suspicious and likely fraudulent. Those fabrications would serve no purpose other than to deceive the scientific community and the general public so that the true identity of SARS-CoV-2 is hidden.” Yan’s contention was plain: “SARS-CoV-2 is a laboratory-enhanced virus and product of gain-of-function research.” It could have been created both easily, “using available materials and well-documented techniques,” and relatively quickly, in about six months. Her concluding recommendation could be anticipated: “The possibility that the SARS-CoV-2 virus could have been created through

gain-of-function manipulations at the WIV [Wuhan Institute of Virology] is significant and should be investigated thoroughly and independently.”

As a postscript to the Li-Meng Yan story, we may note two things. First, within a week, her Twitter account was suspended because the social media company said she had violated “Twitter rules” by publicizing her own work. Second, the *Lancet* COVID-19 commission stated, along with a number of ex cathedra remarks on political and social issues, that “research into the origins of SARS-CoV-2 should proceed expeditiously, scientifically, and objectively, unhindered by geopolitical agendas and misinformation.” On the surface, such research would be in agreement with Yan’s recommendation. However, the *Lancet* authors did not mention China and yet they managed to anticipate “open scientific collaboration” regarding “the possibility of laboratory involvement in the origins of the pandemic.” It is clear, however, that they considered a laboratory origin to be unlikely, citing Andersen et al. as providing evidence of a naturally occurring virus and dismissing “baseless conspiracy theories” and other unnamed allegations.<sup>36</sup>

If the circumstantial case (including Yan’s argument) in favour of the origin of SARS-CoV-2 in the Wuhan Institute of Virology is at all persuasive, the next element in the puzzle seemed comparatively straightforward. Even the most mechanically safe and effective laboratory with the most well-trained staff (and the Wuhan facility exhibited neither of these attributes) is susceptible to human error. A lab worker might accidentally contract a virus, fall ill, go home, and pass it on to a family member who goes shopping at the Huanan market. Both of the foregoing narratives and common sense indicate that accidents happen when human beings undertake risky actions. The Chinese are not exempt. Nor are they exempt from

responsibility for the consequences of their actions. That is, whether one accepts the story that the virus evolved through natural selection and first entered the human population from the wet market or that it leaked from the Wuhan Institute of Virology, it is also clear that Chinese authorities were anything but forthcoming in making public what they knew or even suspected.

Circumstantial evidence regarding the possibility of a leak from the Wuhan lab does not constitute proof and so provides the Chinese with the expected cover of deniability. Whether it is plausible or not is again a political question, not a matter of epidemiology. This is why Shi's supporters and the official statements of PRC authorities declared, often in the face of contrary evidence, that "the Wuhan facility was state-of-the-art and *presumably* [emphasis added] operating with a high degree of care." The authors of that statement then called for "a strong surveillance program" that necessarily "will require goodwill and co-operation with other countries and the WHO."<sup>37</sup> The authors did not say how confident they were that either China or the U.S. would cooperate in such a program. David Cyranoski, writing in *Nature* (June 5, 2020) simply declared the majority opinion, that bats passed on the virus to an intermediate animal, which then passed it on to humans, as being true. He said nothing of the trustworthiness of the Chinese, but criticized the "unsubstantial theories," Trump promoted of a laboratory leak. The fact that the Wuhan Institute of Virology was located in the same city where the outbreak first took place "is probably just a coincidence."<sup>38</sup> Such a contingency, like the conclusions of Imperiale and Casadevall, had nothing to do with biological expertise. They reflect Cyranoski's political judgment.

Moreover, when we consider PRC officials' subsequent behaviour, such political judgments look increasingly dubious, not

to say naïve. We noted above that there was general agreement on the timelines of the outbreak. The first patient was publicly identified no later than December 1, 2019 and his wife a few days later. The obvious implication was that, at the latest, by the second week of December 2019, physicians in Wuhan knew of at least one case where the virus likely spread from one human to another. By the third week in December, doctors in Wuhan had observed a "cluster of pneumonia cases with an unknown cause." By Christmas, two medical staff were suspected of having contracted viral pneumonia and were quarantined (*New York Times*, February 7, 2020). On December 30, Dr. Li Wenliang, an ophthalmologist, informed a group of other doctors in Wuhan about an outbreak of an illness resembling SARS and urged them to take protective measures. One may conclude with confidence that the evidence for human-to-human transmission was growing.<sup>39</sup>

The next day, the Wuhan Municipal Health Commission announced that it had "not found any obvious human-to-human transmission and medical staff infection."<sup>40</sup> Front-line doctors in Wuhan thought otherwise and two were suspected of having contracted the virus. On New Year's Day 2020, the Wuhan Public Security Bureau (PSB) picked up Li and accused him of spreading rumours. As is customary among guests of the PSB, Li acknowledged his errors and promised not to commit any additional "unlawful acts." Seven others were also arrested but knowledge of what happened to them in PSB custody remains with the PSB. One should nevertheless note the obvious: the PSB is not an organization with expertise in public health. It tells the various health commissions what to say and what to do, not vice versa. However one characterizes the People's Republic of China, it is a regime where police agencies such as the PSB, as they say, play a leading role.

That same New Year's Day, the Hubei Provincial Health Commission, which included the City of Wuhan, ordered a genomics company that had tested several samples of the virus to destroy any remaining samples and cease testing. They were also told to stop providing results of their tests to Wuhan hospitals. According to the *New York Times* (January 4, 2020), one hundred and seventy-five thousand persons left Wuhan that day.

Meanwhile, as evidence of human-to-human transmission in Wuhan increased, on January 3, 2020, the National Health Commission of China ordered labs not to publish any further information related to the new disease and to destroy or surrender to the commission any remaining samples of the virus in their possession. The Wuhan Municipal Health Commission issued a statement that "preliminary investigations have shown no clear evidence of human-to-human transmission and no medical staff infections." This statement was repeated on January 5 and reiterated the next day in the *New York Times*, along with the advice of Dr. Wang Lingfa, an expert on emerging diseases at an institute run jointly by Duke University and the National University of Singapore, that "we should not go into panic mode." That same day, the U.S. Centers for Disease Control in Atlanta offered to send a team to assist Chinese medical scientists but the Chinese declined their offer.

On January 8, 2020, the WHO issued a statement that reiterated a remark made a week earlier, that several cases of pneumonia had been diagnosed in Wuhan from an unknown cause. The WHO then praised China for having so quickly diagnosed and managed the outbreak: "WHO does not recommend any specific measures for travelers. WHO advises against the application of any travel or trade restriction on China based on the information currently available." On January 10, 2020, the *New York Times* again quoted

the Wuhan City Health Commission that "there is no evidence the virus can spread among humans." That same day, Li began coughing and developed a fever after having unknowingly treated a patient with the virus a few days before. He was hospitalized on January 12 and died three weeks later.

About the same time, a Toronto software company called Blue Dot (after Carl Sagan's description of an image of the Earth taken from Voyager One as a "pale blue dot") used a combination of artificial intelligence and a content-analysis capacity to scan thousands of news articles in sixty-five languages, to inform its clients—one of which was the government of Canada—on New Year's Day, that a new and unidentified illness had appeared in Wuhan. Two weeks later, they published a paper integrating these health data with airline flight data to predict where the virus was likely to show up next.<sup>41</sup> It seems to us that if a commercial operation such as Blue Dot could accurately detect the initial outbreak and accurately predict its spread, then government intelligence agencies, particularly in the United States, would have at least the same capability and would have drawn the same conclusions.

Apparently, the Chinese authorities thought differently. The Wuhan City Health Commission continued to repeat a bogus report dating from early January that no medical staff had been infected and "no clear evidence of human-to-human transmission had been found." No clear evidence, one may infer, was not as big a lie as previous statements about no evidence. On January 14, five weeks after the evidence of human-to-human transmission first appeared in Wuhan, the WHO repeated the Wuhan City Health Commission "finding." That same day, the Canadian Public Health Agency said the risk in Canada was "low." As Blue Dot predicted, coronavirus cases had by then been diagnosed in Thailand and Japan, which

may have inspired the Wuhan Municipal Health Commission to acknowledge, on January 15, that “the possibility of limited human-to-human transmission cannot be ruled out.” On January 17, the Americans announced that travellers from Wuhan would have to undergo screening for symptoms associated with COVID-19. Three days later, Theresa Tam, Canada’s chief public health officer, said that “out of an abundance of precaution” travellers from “virus-infected areas would be asked to report any flu-like symptoms.” This self-reporting obviously depended on the good will of travellers to

Canada. On January 23, the first Canadian patient with COVID-19 was admitted to the emergency department at Sunnybrook Hospital in Toronto. A week later, Tina Namiesniowski, president of the Public Health Agency of Canada, told a parliamentary health committee that “the system is working as expected.”<sup>42</sup> Tam reiterated that voluntary self-isolation for symptomatic travellers was all that was needed in Canada and “there is no evidence” that it was necessary to quarantine asymptomatic persons arriving from “virus-infected areas.” She did not mention China.

## OTHER JANUARY 2020 EVENTS

A few more January events might be noted. On January 22, the director-general of the WHO, Tedros Adhanom Ghebreyesus, again praised the way China had dealt with the outbreak.<sup>43</sup> By then, millions of people had left Wuhan, travelling around China for the Lunar New Year celebrations and travelling abroad as well. An unknown, but presumably significant, number of them were carrying the virus.<sup>44</sup> Next day, Chinese authorities began a quarantine lockdown of Wuhan. On January 30, the WHO declared the COVID-19 outbreak a “public health emergency of international concern.” Six weeks later, the WHO declared that the outbreak constituted a pandemic.

On January 24, 2020, two Chinese nurses travelled to Wuhan to assist in treating the COVID-19 outbreak. They provided a detailed description of their experience and the difficulties they encountered, and ended with a plea for nurses from around the world to come to their assistance. They published their account as a letter to the *Lancet: Global Health*, on February 24, 2020. Two days later, the authors asked the *Lancet* to withdraw the letter, saying that they were not first-hand witnesses. When contacted by Retraction Watch to provide more details on what prompted the retraction, the authors did not respond, which prompted several correspondents to Retraction Watch to suggest that the Chinese authorities persuaded the authors to request the retraction because the authorities did not approve of the bad image created by the original letter; namely, that matters were “more difficult and extreme than we could ever have imagined.”<sup>45</sup>

A third January event worth noting was a press conference on the 29th at which Tam informed Canadians that the risk of contracting COVID-19 was low because there were then few cases in the country. Over a year later, on March 25, 2021, Auditor-General Karen Hogan issued a report that said the Public Health Agency of Canada used inappropriate methods to estimate the risk COVID-19 posed to Canadians because it ignored forecasts of the global pandemic spread and looked only at Canadian data to make a risk assessment.<sup>46</sup> In response to Hogan’s report, Tam said that public health agencies “need to be predictive organizations and not just being able to assess the risk of that present moment.” To this convoluted observation Wesley Wark, a security expert who actually knows something about risk assessment, replied that the Public Health Agency of Canada had, in fact, made predictions: “It was just making bad predictions.” To which the agency responded by pledging “to review the methodology by the end of next year.”

## TAIWAN'S SUCCESS WAS BORN OF DISTRUST OF BEIJING'S PUBLIC STATEMENTS

Most Canadians, who may or may not be ethnically Chinese, have never visited China. They may have favourable or unfavourable views of the PRC, just as they may have favourable or unfavourable views of the WHO, but it is unlikely that they have ever had any direct experience of either. China may no longer exemplify the cliché of the mysterious East, but for most Canadians the image of that country is mediated by socially authorized knowers and their specialized knowledge.

As is evident from the chronology of the COVID-19 outbreak in Wuhan, former president George W. Bush was clearly wrong when he said that China would become a "responsible stakeholder" when in 2001 it joined the World Trade Organization.<sup>47</sup> From December 2019 and probably earlier, PRC officials knew what was happening in Wuhan, namely that a contagious virus was at large. Whether it came from a wet market or a more sinister source was secondary. Chinese authorities "chose to cover up, obfuscate and suppress the truth about COVID-19." Indeed, "China lied in an aggressive, systematic and pervasive fashion." According to Burton and Byers, China lied to the WHO as well as to the rest of the world.<sup>48</sup> Assuming that members of the WHO were unaware they were being lied to, China breached articles Six and Seven of the WHO International Health Regulations, which it was legally obliged to uphold.<sup>49</sup>

There was one obvious exception to the general credulity among the nations of the world to accept the PRC's and WHO's assurances on the absence of early awareness of human-to-human transmission of COVID-19: Taiwan.

As early as mid-December 2019, Taiwan both reported to the WHO that COVID-19 was humanly contagious and acted on the intelligence that was available from Wuhan. Taiwanese authorities knew from past experience that PRC statements were not to be trusted. Moreover, having been excluded from the WHO at China's behest, they also distrusted WHO statements because they viewed that organization as a front for the PRC. Accordingly, during the early weeks of the outbreak, when the rest of the world was listening to and accepting underestimated threats issued by the WHO, Taiwan was compelled to make its own estimates and to act on them. In short, Taiwanese self-reliance, a consequence of the PRC/WHO policies, served them well. By March 2020, the rest of the world had noticed that Taiwan was dealing quite well with the outbreak, which was exactly what Beijing did not want to be noticed. And so began Beijing's continuing disinformation campaign against Taiwan and its own narrative rewrite to portray the PRC in a more favourable light.<sup>50</sup>

There is not much doubt that Taiwan was correct in its suspicion of Beijing's under-reporting of the virus outbreak in Wuhan. Were they also right about the WHO? It is certainly true that the WHO did nothing to disseminate the lessons learned from Taiwan's response to the COVID-19 outbreak. It is also clear that the reason the WHO said nothing about Taiwan's relative success is that the PRC forbade any acknowledgment of it. Those who counter that the WHO's silence regarding Taiwan's success was a condition for PRC cooperation with the WHO, are burdened with the necessity of citing instances when Beijing was ever helpful. This they have been unable to do, which leads to the obvious conclusion: "From the outset of COVID-19's outbreak, the WHO's obligation to prepare the world was subordinated to its leadership's determination to protect China from scrutiny. Informants who rang the



alarm were disregarded and information that could have averted a calamity was withheld from the world.”<sup>51</sup>

Charles Burton drew the most important implication: “So, the question looms: did politically motivated misinformation, issued by Beijing, and uncritically related to the world via the WHO, lead to massive numbers of unnecessary deaths and economic hardship around the world?”<sup>52</sup> Another question looms as well, which Burton likely thought of and Western intelligence agencies are even more likely to have investigated: Was the PRC’s under-reporting and systematic lying followed by extensive travel out of, but not into, Wuhan, a deliberate act to spread rather than contain the virus?

## THE JOINT WHO-CHINA STUDY

In late November 2020, David Relman, the Stanford microbiologist we quoted above, raised the issue, once again, of the origin or “recent evolutionary history” of the virus.<sup>53</sup> As had so many others, he criticized the now-standard narrative of Andersen et al., on scientific, not political grounds. He made the point that the “proximate ancestors” of SARS-CoV-2 could be discovered and their “desirable” properties combined using well known recombinant techniques. He allowed that laboratory manipulation and “release, with the clear intention of causing harm” was “seemingly much less likely.” He did not support this ex cathedra opinion with either evidence or argument. He did, however, make the obvious point: “if SARS-CoV-2 escaped from a lab to cause the pandemic, it will become critical to understand the chain of events and prevent this from happening again”—even if it was not deliberate and intended to cause harm. As others have observed as well, in order to understand the chain of events that led to the outbreak, the PRC’s cooperation in a serious investigation would be required. He added that a serious, credible, trustworthy, and effective investigation of the recent evolutionary history of SARS-CoV-2 “clearly serves the interests of every person in every country on this planet.”

The great problem with Relman’s statement, along with similar remarks by scientists who were not in the WHO’s employ nor conducting research with Chinese colleagues, is that it was politically naïve, however true it may appear on the surface.<sup>54</sup> Granted that the “interests of every person” on Earth would be served if the virus’s recent evolutionary history were known. It is also true that “persons” exist in political units and the interests of those political units, as understood by the leadership of those political units, is what

matters. One such political unit, the PRC, had “interests” that ensured that nothing, in fact, would be known. That particular fact, of course, is itself politically significant.

More than a year after the outbreak of COVID-19, China permitted a hand-picked WHO team to visit Wuhan, conduct some research, and publish their report.<sup>55</sup> A few preliminary observations may be in order. The first is that the Joint Report looks like a genuine scientific report. It contains dozens of tables, lots of data, multicoloured graphs and maps, summary findings, suggestions for future research, and so forth. A second is that, if Chinese officials actually knew what happened during the previous fifteen or so months, they would have had ample time to sanitize or destroy any evidence that might compromise their official narrative. Third, the joint team conducted what they called “a qualitative risk assessment” based on arguments for and against each of four “pathways” for the introduction, but not for the diffusion, of the virus that they considered, even though none of the members of the joint team was identified as an expert in risk analysis and their conclusions, based on various narrative arguments were simply commonsensical, or allegedly commonsensical, judgments. Moreover, even if one were convinced that the WHO was independent of China, and we do not share that opinion, the WHO is not an investigative body. These limitations on the joint team were evident long before the WHO team members went into two-week quarantine in January 2021.

The four pathways for the introduction of the virus were:

1. Direct zoonotic transmission to humans (spillover);
2. Introduction through an intermediary host followed by spillover;

3. Introduction through the (cold) food chain;
4. Introduction through a laboratory incident.

The joint team concluded that the first pathway was possible; the second was likely or very likely; the third was possible; the fourth was extremely unlikely. These conclusions, of course, corresponded to the official PRC narrative.

We have already discussed the first two pathways; the third is, in our view, not plausible.<sup>56</sup> Interestingly enough, the presentation of data, which provided the report with the odour of science, dealt only with the first three pathways. There was no data or narrative evidence introduced dealing with the possibility of a “laboratory incident.” The explanation and dismissal of this pathway was brief. First, “we did not consider the hypothesis of deliberate release or deliberate bioengineering of SARS-CoV-2 for release, the latter has been ruled out by other scientists following analysis of the genome.” A note identified the other scientists as Andersen et al. Nothing was said of a deliberate release, not even a pro forma denial. The arguments in favour of a laboratory incident were that “although rare, accidents do happen” and the Wuhan CDC laboratory did, in fact, move in December of 2019 to a new location near the Huanan wet market. “Such moves can be disruptive for the operations of any laboratory.”

The arguments against were simple: there was no evidence of circulation of SARS-CoV-2 before December 2019 and thus “the risk of accidentally culturing SARS-CoV-2 in the laboratory was extremely low.” Besides, the three Wuhan laboratories that handled CoVs “all had high quality biosafety level (BSL-3 or -4) facilities that were well managed,” and they reported no COVID-19 infections among staff. The Chinese CDC lab that moved on December 2, 2019, reported no disruptions or incidents.<sup>57</sup>

If you took the Joint Report at face value, it is easy to conclude that the fourth pathway, introduction of the virus by way of a laboratory incident, was indeed extremely unlikely. For good reason, however, not everyone (including us) was convinced. The detailed reasons for skepticism are all tributary to one big fact: as Matthew Pottinger, Trump’s deputy national security advisor, explained to Jim Geraghty, the Chinese turned management of the crisis over to the PLA, not to the Chinese CDC. “So the director of the Chinese CDC, based on public reporting, didn’t know...that this thing was circulating until the last day of December, which is incredible when you think about that. So it looks like the Chinese CDC to some extent was cut out because the Chinese Communist Party turned to its military to try to cover this thing up, to try to contain it until it was too late.” Now, the American CDC had connections with its Chinese counterparts but no one had connections with the PLA. The whole point of turning operational control over to the PLA was to ensure secrecy.<sup>58</sup>

That means that circumstantial evidence and intelligence, in both senses of the term, along with political common sense are all important considerations. As Pottinger said, “if you weigh the circumstantial evidence” human intervention, not a “natural outbreak” looks far more likely. “We have very strong reason to believe that the Chinese military was doing secret classified animal experiments in that same laboratory [WIV], going all the way back to at least 2017.” They also have “good reason to believe that there was an outbreak of flu-like illness among researchers working at the Wuhan Institute of Virology in the fall of 2019,” immediately prior to the first publicly documented cases being reported. If the U.S. intelligence was accurate, a number of otherwise curious (not to say suspicious) actions by the PRC authorities made perfect sense.

From the start, members of the WHO team were given limited access to personnel, facilities, and information, and were quite prepared “to take the word of their Chinese host at face value.”<sup>59</sup> One obvious reason for their willingness to trust their hosts was that several members of the WHO team (particularly Marion Koopmans and Peter Daszak) already had close connections with the Wuhan institute.<sup>60</sup> Moreover, the joint team spent a total of four hours at the Wuhan institute (*National Post*, March 30, 2021) and collected no documents. Specifically, the Chinese authorities refused to provide raw personal data that the WHO team requested (*Wall Street Journal*, February 12, 2021). This meant that no detailed information of what actually went on in the lab was ever made public. To be even more specific, as Sirotkin and Sirotkin noted: “for whatever reason, the Wuhan Institute of Virology has refused to release the lab notebooks of its researchers,” which are ubiquitous in any lab and would be “meticulously detailed given the sensitive and delicate work that takes place” there. Moreover, “these notebooks would likely be enough to exonerate the lab from having any role in the creation of SARS-CoV-2.” Unless, of course, the lab notebooks would prove the opposite.<sup>61</sup>

Relman summarized the limitation of the Joint Report: “if the only information you’re allowing to be weighed is provided by the very people who have everything to lose by revealing such evidence, that just doesn’t come close to passing the sniff test.”<sup>62</sup> Several Australian scientists made the same point in a letter to the *Sydney Morning Herald* (March 5, 2021). Finally, there is the statement of Robert Redfield, former director of the American CDC, who told CNN on March 26, 2021, that he thought the virus escaped from a Wuhan lab in the fall of 2019. The reason had been public since the spring of 2020: the virus would have been less contagious had it jumped directly from an animal to humans. “I don’t think this was somehow transmitted from bats to humans,” Redfield said. “The moment the virus was transmitted to humans, it became one of the most infectious viruses we know about human-to-human transmission.” That particular feature of SARS-CoV-2 by itself suggests human action, namely human intervention in its production. The only question left unanswered so far is whether it was the result of a GoF experiment, which seems to us to be highly likely. Whether the leak from the Wuhan lab, most likely the Wuhan Institute of Virology, was accidental or deliberate is known only to the PLA and their political masters.

## CONCLUSION

The major point we have argued for in this paper is pretty much beyond dispute: however the COVID-19 pandemic began, it began in China.<sup>63</sup> And China, for most Canadians, is a somewhat enigmatic locale even if it is not seen as a threat. The Chinese origin of the pandemic is significant, however, because of the increase in Chinese importance and power over the past generation. So far as the present discussion is concerned, it is somewhat surprising that China's role in the genesis of the COVID-19 pandemic has played almost no part in the accompanying moral panic. This may have been because Tedros admonished the world early on that imposing travel restrictions on China would be "discriminatory." Such restrictions would indeed be discriminatory; that was the whole point of them. But for Tedros, this was meant to suggest racism. Downplaying Chinese responsibility may also have been a result of the behaviour of WHO officials such as Canadian Bruce Aylward, the team leader of the joint mission between the WHO and the PRC, who refused even to utter the toxic word "Taiwan" when a Hong Kong reporter asked him directly about the island nation's obvious success. A few weeks later, Aylward refused, without explanation, to leave his safe perch in Geneva and appear before a parliamentary committee in Ottawa to discuss the links between China and the WHO.<sup>64</sup> Tam, who had spent much of her career at the WHO—still sits on important WHO committees, and like Tedros, is a graduate of the University of Nottingham—has never emphasized the origin of the virus or the appalling behaviour of Chinese officials. Also like Tedros, starting with a press conference on January 29, 2020, mentioned above, she equated criticism—or even mention—of the PRC with racism. When asked for details of racist attitudes, she could provide no examples. This is hardly surprising

since many of the critics were members of the Chinese-Canadian communities in Vancouver and Toronto. She was also entirely oblivious of the fact that by offering a commentary on racism she was making a political and not a medical or epidemiological observation, her supposed specialty and bureaucratic remit.

China (and Russia for that matter) has unquestionably taken advantage of the opportunity afforded by the pandemic to enhance its international interests within the WHO. The Chinese have used what we now call "pandemic diplomacy," initially to acquire large amounts of high quality medical supplies and personal protective equipment (PPE) from Western sources, including Canada, and then selling higher priced but often defective PPE in return.<sup>65</sup> They also used their position in the global pharmaceutical supply chain to "weaponize medicine" and then obscured their actions with disinformation and false narratives to deflect responsibility for the spread of the virus.<sup>66</sup> As Richard Shimooka noted, "with the virus having ravaged through Europe and now the United States, China has attempted to position itself as the global leader in the fight against COVID-19—as opposed to the country whose initial cover-ups had led to the pandemic in the first place."<sup>67</sup> Chinese successes, beginning in the late winter of 2020, emboldened them to move against Hong Kong and India, in Ladakh, along the Indo-China border. China also deployed its "wolf diplomacy" against countries such as Canada, Australia, and the U.K. for not having been sufficiently pro-Chinese.

As for the government of Canada, led by a person whose admiration of the PRC has been extensively documented over the years,<sup>68</sup> Health Minister Patty Hajdu's April 2, 2020 press conference was particularly revealing. Before assuming responsibility for Canadians' health, Hajdu was a graphic designer; the prime minister picked her as the post-election

replacement for Jane Philpott, M.D., who had been purged before the 2019 election from the Liberal caucus for holding incorrect opinions on the SNC-Lavalin scandal and for supporting then-attorney general Jody Wilson-Raybould on the question of the rule of law. At the press conference, Hajdu berated a CTV reporter for “feeding into conspiracy theories” by daring to question whether Chinese data were reliable. Specifically, the reporter had asked Hajdu for the Canadian government’s response to observations by American intelligence officials that the Chinese statistics were worthless. Hajdu immediately added the cliché invocation that “we’re all in this together.”<sup>69</sup> So long as COVID-19 exists anywhere, “it exists in all our countries.” Accordingly, “we actually

have to work together as a globe.” She added that “there is no indication that the data that came out of China in terms of their infection rate and their death rate was falsified in any way.” Not even the Chinese believed that: within two weeks, the PRC doubled the estimated number of deaths in Wuhan.<sup>70</sup> For most Western analysts, the revised Chinese number was still a gross underestimation.

Despite the best efforts of the WHO and their supporters in the government of Canada, the malign reality is that China’s role in the COVID-19 pandemic remains stubbornly relevant. China is rather like a miasmatic mist that renders the other constituent elements of the COVID-19 moral panic obscure.

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## ENDNOTES

1. C. Huang et al., "Clinical Features of Patients Infected with 2019 Novel Coronavirus in Wuhan, China," *Lancet*, 395 (2020), 497–506. See also George Arbuthnott, Jonathan Calvert, and Philip Sherwell, "Insight Investigation: Revealed: Seven-Year Coronavirus Trial from Mine Deaths to a Wuhan Lab," *Sunday Times*, July 4, 2020. A U.S. State Department fact sheet reported that scientists at the Wuhan Institute of Virology contracted an illness in the fall of 2019 presenting symptoms similar to COVID-19. *Epoch Times*, January 21, 2021.
2. Jane Dalton, "From Coronavirus to Antibiotics: The Ways We Use Animals 'Still Risk Spreading Disease,'" *The Independent*, March 18, 2020. "WHO-convened Global Study of Origins of SARS-CoV-2: China Part." Joint-WHO-China Study, January 14–February 10, 2021, Joint Report, 98.
3. See The Canadian Press, "Public Health Agency Probes Matter at National Microbiology Laboratory," CTV News, July 16, 2019; Karen Pauls, "Canadian Scientist Sent Deadly Viruses to Wuhan Lab Months before RCMP Asked to Investigate," CBC News, June 14, 2020. Several already deadly pathogens were sent to the Wuhan Institute of Virology from Winnipeg for gain-of-function experiments (discussed below) that were not conducted in Canada; they were prohibited because they were too dangerous. In July 2019, two Chinese nationals, Xiangguo Qiu and her husband, Keding Cheng, (and several of Qiu's students) were escorted from the National Microbiology Laboratory and had their security clearances removed. In March 2021, when the head of the Public Health Agency of Canada, Iain Stewart, was asked about these events by members of the Parliamentary Committee on Canada-China Relations, he declined to answer. *Epoch Times*, March 25, 2021.
4. Elsa B. Kania and Wilson Vorndick, "Weaponizing Biotech: How China's Military is Preparing for a 'New Domain of Warfare,'" *Defense One*, August 14, 2020.
5. David Cyranoski, "Inside China's Pathogen Lab," *Nature*, 542, February 23, 2017: 399–400. See also Georg Fahrion, et al., "Muss Peking für die Pandemie-Schäden zahlen?" *Spiegel Politik*, May 6, 2020.
6. Arbuthnott, Calvert, and Sherwell, "Insight Investigation." Indeed, as early as 2007, infectious disease specialists had noted "the presence of a large reservoir of SARS-CoV-like viruses in horseshoe bats, together with the culture of eating exotic mammals in southern China, is a time bomb. The possibility of the re-emergence of SARS and other novel viruses from animals or laboratories should not be ignored." Other critics of consuming exotic animals advocated not just shutting down Chinese wet markets but cutting out meat altogether. This act, apparently, would help avoid future pandemics (*National Post*, June 26, 2002). See also Vincent C. C. Cheng, "Severe Acute Respiratory Syndrome Coronavirus as an Agent of Emerging and Reemerging Infection," *Clinical Microbiology Reviews*, 20 (2007), 664; see also Yi Fan et al., "Bat Coronavirus in China," *Viruses*, 11 (2019): 210.
7. The technique of acquiring coronaviruses from this reservoir of pathogens reminds one of a joke of Aristophanes (*Clouds*, 141–66): the Chinese scientists swabbed the tiny bat anuses and collected samples of bat feces and urine.
8. Arbuthnott, Calvert, and Sherwell, "Insight Investigation."
9. See National Academy of Sciences, "Gain-of-Function Research: Background and Alternatives."
10. See Michael J. Selgelid, "Gain-of-Function Research: Ethical Analysis," *Science and Engineering Ethics*, 22 (2016): 923–64; Arturo Casadevall and Michael J. Imperiale, "Risks and Benefits of Gain-of-Function Experiments with Pathogens of Pandemic Potential, Such as Influenza Virus: A Call for Science-Based Discussion," *Mbio*, 5:4 July–August, 2014.
11. Talha Burki, "Ban on Gain-of-Function Studies Ends," *Lancet Infectious Diseases*, February 2018.
12. The original report was by P. Zhou et al., "A Pneumonia Outbreak Associated with a New Coronavirus of Probable Bat Origin," *Nature*, 579, February 3, 2020: 270–73.
13. As a result of forest-clearing for palm oil plantations, horseshoe bats were driven into closer proximity to humans, thus making the transfer easier, whether it was direct or via an intermediate animal. See Adam Matthews, "Review of Honigsbaum," *The Pandemic Century, Postdigital Science Education*, July 20, 2010.

14. Jon Cohen, "Trump 'Owed us an Apology,' Chinese Scientist at the Center of the COVID-19 Origin Theories Speaks Out," *Science*, July 24, 2020. The "us" involved was the team she leads at the Wuhan Institute of Virology.
15. See T. T. Lam et al., "Identifying SARS-CoV-2-Related Coronaviruses in Malayan Pangolins," *Nature*, 583, July 9, 2020: 282–5.
16. ADIA document quoted in Fred Guterl et al., "The Controversial Experiment and Wuhan Lab Suspected of Starting the Coronavirus Pandemic," *Newsweek*, April 27, 2020.
17. Rossana Segreto and Yuri Deigin, "The Genetic Structure of SARS-CoV-2 Does Not Rule out a Laboratory Origin," *BioEssays*, 43:3, November 17, 2020.
18. See Joby Warrick et al., "Chinese Lab Conducted Extensive Research of Deadly Bat Viruses, But There is No Evidence of Accidental Release," *Washington Post*, April 30, 2020.
19. The problem was thoroughly discussed in Jon Cohen, "Surprising Twist in Debate over Lab-Made H5N1," *Science*, 335, March 9, 2012: 1155–56; Martin Enserink and Jon Cohen, "One H5N1 Paper Finally Goes to Press: Second Greenlighted," *Science*, 336, May 4, 2012: 529–30; Tina Hesman Saey, "Second Blocked Flu Paper Released," *Science News*, 182, July 14, 2012: 8. The GoF research was controversial for an obvious additional reason: potential bioterrorists might use the information for their own purposes.
20. Karl Sirotkin and Dan Sirotkin, "Might SARS-CoV-2 Have Arisen via Serial Passage through an Animal Host or a Cell Culture?" *BioEssays*, 42 (2020), August 12.
21. Segreto and Deigin, "The Genetic Structure."
22. Colin Carlson, "From PREDICT to Prevention, One Pandemic Later," *Lancet*, March 30, 2020.
23. Sirotkin and Sirotkin, "Might SARS-CoV-2 Have Arisen via Serial Passage,"; see also M. Letko et al., "Functional Assessment of Cell Entry and Receptor Usage for SARS-CoV-2 and Other Lineage B Betacoronaviruses," *Nature Microbiology*, 5 (2020), 562–9.
24. Segreto and Deigin, "The Genetic Structure."
25. Kristian Andersen et al., "The Proximal Origin of SARS-CoV-2," *Nature Medicine*, March 17, 2020: 450–55.
26. Guterl et al., "The Controversial Experiments."
27. Sirotkin and Sirotkin, "Might SARS-CoV-2 Have Arisen via Serial Passage."
28. Quoted in P. Erica, "Coronavirus is 'Perfectly Adapted' to Infect Humans Raising Suspicions that It's Either Man-made or a Complete Fluke of Nature: Australian Scientists," *Science Times*, May 27, 2020.
29. Quoted in Charles Schmidt, "Lab Leak: A Scientific Debate Mired in Politics—and Unresolved," *Medscape*, March 17, 2021.
30. Schmidt, "Lab Leak."
31. Cohen, "Trump 'Owes us an Apology.'"
32. Jan van der Made, "Conspiracy Theories: US-China Clashes Undermine Credibility of Theory that COVID-19 was Man Made," *Radio France International*, September 17, 2020.
33. Jay Hilotin, "COVID-19's Origins Shrouded in Mystery: Here's Why," *Gulf News: Dubai*, April 29, 2020.
34. Prashant Pradhan et al., "Uncanny Similarity of Unique Inserts in the 2019-nCoV Spike Protein to HIV-1 gp120," *BioRxiv*, January 31, 2020. Rasmus Nielsen, an evolutionary biologist at the University of California-Berkeley, said the Indian suggestion pointing to a similarity between SARS-CoV-2 and HIV was a "crackpot" hypothesis and "shoddy science" since the Indians evidently had no clue how molecular evolution works. Thus they withdrew their paper after a deluge of criticism. See Schmidt, "Lab Leak."
35. Tamar Lapin, "Chinese Virologist Posts Report Claiming COVID-19 was Made in Wuhan Lab," *New York Post*, September 14, 2020; see also Li-Meng Yan et al., "Unusual Features of the SARS-CoV-2 Genome Suggesting Sophisticated Laboratory Modification Rather than Natural Evolution and Delineation of Its Probable Synthetic



Route,” (New York: Rule of Law Society and Rule of Law Foundation, n.d.). The Rule of Law Society and Foundation are supported by Guo Wengui, a wealthy Chinese critic of Beijing. See also Michael Palmer, “Notes on COVID,” Department of Chemistry, University of Waterloo, which provided a technical discussion of Yan’s papers and supported her conclusions, January 14, 2021.

36. Staff, “COVID-19 Commission Statement on the Occasion of the 75th Session of the UN General Assembly,” *Lancet*, September 14, 2020: 1, 4. On September 21, 2020 Johns Hopkins Center for Health Security published a criticism of Yan’s paper, K. L. Warmbrod et al., “In Response: Yan et al., Preprint Examination of the Origins of SARS-CoV-2,” most of which was highly technical. One observation was not: “coronavirus research performed in a Chinese military research institute is not in itself suspicious.” On October 2, 2020 an MIT publication, *Rapid Reviews: COVID-19*, published a similar criticism. See Amy Harris, “New Peer Reviews: Yan Report’s Claims that SARS-CoV-2 was Created in a Chinese Lab are Misleading and Unethical,” According to the *Washington Post*, February 12, 2021, the editor of *Rapid Reviews*, Stephen M. Bertozzi, decided, after seeing Yan interviewed on television, “to correct the scientific record,” and debunk this “garbage science.” The *Post* did not explain how one TV interview told Bertozzi so much so quickly. Perhaps all he needed to know was that it appeared on “Tucker Carlson Tonight,” on Fox News. See also Joan Donovan and Jennifer Nilsen, “Cloaked Science: The Yan Reports,” which deals only with media coverage, *The Media Manipulation*, February 12, 2021. Other equally vehement criticism—or rather, denunciations—are easily available on the Internet.
37. Michael J. Imperiale and Arturo Casadevall, “Rethinking Gain-of-Function Experiments in the Context of the COVID-19 Pandemic,” *American Society for Microbiology Journal*, 11, August 2020.
38. See also Jamie Metz, “Origins of SARS-CoV-2,” *Newsletter*, April 16, 2020.
39. There is now established evidence that transmission of the virus had made its way to Europe by late December 2019. See Mary Van Beusekom, “Study: COVID-19 Detected in France in Late December,” Centre for Infectious Disease Research and Policy (CIDRAP, University of Minnesota), May 5, 2020, <https://www.cidrap.umn.edu/news-perspective/2020/05/study-covid-19-detected-france-late-december>. Subsequently, serological tests indicated the presence of the virus in both France and the U.S. by early December, 2019. See *The Independent*, December 2, 2019, and *ScienceAlert.com*, December 3, 2019.
40. Staff, “China Pneumonia Outbreak: Mystery Virus Probed in Wuhan,” BBC News, January 3, 2020.
41. Isaac Bogoch et al., “Pneumonia of Unknown Aetiology in Wuhan China: Potential for International Spread via Commercial Air Travel,” *Journal of Travel Medicine*, January 14, 2020; Eric Niiler, “An AI Epidemiologist Sent the First Warnings of the Wuhan Virus,” *Wired*, January 25, 2020; see also *U of T News*, March 27, 2020.
42. When she resigned in September 2020, Namiesniowski noted that she and Tam made “an exceptional team.” We agree.
43. Tedros’s home country, Ethiopia, had been a recipient of a great deal of Chinese aid and direct investment. The PRC strongly supported his rise to his present position.
44. Shadi Hamid, “China is Avoiding Blame by Trolling the World,” *Atlantic*, March 19, 2020.
45. Yingchung Zeng and Yan Zhen, “Chinese Medical Staff Request International Medical Assistance in Fighting COVID-19,” *Lancet: Global Health*, February 24, 2020; *Retraction Watch*, February 27, 2020.
46. Grant Robertson and Marieke Walsh, “Tam Criticized for Supporting ‘Indefensible’ Assessment of COVID-19 Risk,” *Globe and Mail*, March 29, 2021.
47. See the remarks of Sen. Marco Rubio, “Coronavirus: More Proof China is Unfit for Global Role,” *Real Clear Politics*, February 19, 2020; Marcus Kolga, “When Will the Chinese Government be Held Accountable for the Coronavirus?” *Maclean’s*, March 17, 2020; Sarah Teich, *Not Immune: Exploring Liability of Authoritarian Regimes for the COVID-19 Pandemic and its Cover-Up*, (Ottawa: Canadian Security Research Group and Macdonald-Laurier Institute, 2020): 69–74.
48. Charles Burton and Brett Byers, “Holding China Accountable for the COVID-19 Cover-up,” *Inside Policy*, Macdonald-Laurier Institute, June 2020: 24.

49. For a comprehensive account of China flouting its legal obligations, see Teich, *Not Immune*. In late May 2020, then-president Donald Trump announced the U.S. was terminating its relationship with the WHO, saying that the organization had become a puppet of China. See *Medscape*, May 29, 2020.
50. J. Michael Cole, "How Taiwan is Leading by Example: The Global War on the COVID-19 Pandemic," Commentary, Macdonald-Laurier Institute, March 2020; see also Kurt M. Campbell and Rush Doshi, "The Coronavirus Could Reshape Global Order," *Foreign Affairs*, March 16, 2020; see also Kathy Gilsinan, "How China is Planning to Win Back the World," *Atlantic*, May 28, 2020. See also *Medscape*, November 16, 2020, and Raymond Zbong et al., "No 'Negative' News: How China Censored the Coronavirus," *New York Times*, December 19, 2020.
51. Kapil Komireddi, "COVID-19's Willing Accomplice," *The Critic*, April 23, 2020.
52. Charles Burton, "Beijing's Coronavirus Bungling Makes Canada's Choice on Huawei Even Easier," *Globe and Mail*, April 24, 2020; see also Amy Karam, "Will COVID-19 Shift Huawei 5G Debate to Economic Security and Global Competitiveness?" Canadian Global Affairs Institute, Policy Perspectives, June 2020. A study from the University of Southampton estimated that reductions of up to 95 percent in the spread of COVID-19 (and concomitant reductions in "unnecessary deaths and economic hardship") were possible if PRC authorities had intervened in the Wuhan outbreak three weeks before they did. That is, during the early period when the existence and infectious nature of the virus was known to authorities but suppressed. See Shengjie Lai, et al., "Effect of Non-Pharmaceutical Interventions for Containing the COVID-19 Outbreak in China," *MedRxiv*, March 13, 2020. For a detailed, but in our view rather naïve account of the WHO response, see Gabriel Blouin-Genest et al., "WHO Global Response of COVID-19: Communicating Risk/Risky Communications, Rapid Results Report, Phase 1: December 31, 2019 to January 31, 2020," (University of Ottawa, Université de Sherbrooke, Centre on Governance, Working Paper Series, Research Paper No. 01/20/EN, May 2020).
53. David Relman, "To Stop the Next Pandemic, We Need to Unravel the Origins of COVID-19," *PNAS*, November 24, 2020.
54. Similar remarks were made by the Lancet SARS-CoV-2 commission, September 14, 2020, and by Imperiale and Casadevall, *American Society for Microbiology Journal*, August 2020, and by Yan, among others.
55. "WHO-convened Global Study of Origins of SARS-CoV-2: China Part. Joint-WHO-China Study, 14 January-10 February, 2021," Joint Report. We refer to this document as the Joint Report.
56. See the remarks of Ross Clark, "What Should We Make of the WHO COVID Report?" *The Spectator*, March 31, 2021.
57. Joint Report, 118–19.
58. Pottinger quoted in Geraghty, "The 'Human Error' Theory on COVID Origin Still Very Much Alive," *National Review Online*, February 22, 2021.
59. Gilles Demaneuf, "WHO Knows? We Still Can't be Sure of COVID's Origins," *The Spectator*, April 1, 2021. See also Eamon Barrett, "WHO Team Investigating the Origin of COVID-19 Will Enter China after Delays," *Fortune*, January 11, 2021; Alina Chan and Matt Ridley, "The World Needs a Real Investigation Into the Origins of Covid-19," *Wall Street Journal*, January 15, 2021.
60. Frank Fang, "WHO Probe Under Scrutiny over Investigators' Ties to Chinese Regime," *Epoch Times*, March 4, 2021.
61. Sirotkin and Sirotkin, *BioEssays*, 42 (2020), August 12, 2020.
62. *Washington Post*, February 9, 2021. See also Stephen L. Miller, "Nobody Believes China Except the World Health Organization and the US Media," *The Spectator*, March 30, 2021.
63. The first epicentre or "hot spot" outside China was in Iran, specifically the "Holy City" of Qom. According to the *Wall Street Journal*, March 11, 2020, Qom is also the site of Iran's main economic links to China. From Iran the virus apparently spread to Canada, New Zealand, and New York City. See Negar Mojtahedi's report, *Global News*, March 1, 2020, and Noam Blum, *Tablet*, March 13, 2020; see also Teich, *Not Immune*, 75–8, and Maysam Behraves, "The Untold Story of How Iran Botched the Coronavirus Pandemic," *Foreign Policy*, March 4, 2020.

64. Steven Chase, "WHO Balks at Ottawa's Request that Key Adviser Testify before MPs," *Globe and Mail*, April 29, 2020. See also *True North Wire*, April 30, 2020, and August 19, 2020.
65. Frank Fang, "During Pandemic, China Sent Millions of Counterfeit Masks, Test Kits to US: Customs Data," *The Epoch Times*, February 5, 2021.
66. See Marcus Kolga et al., "How China Weaponized its Supply Chain," *Maclean's*, April 7, 2020, and Kirk Lancaster and Michael Rubin, "Assessing the Early Response to Beijing's Pandemic Diplomacy," Blog Post, April 30, 2020.
67. Richard Shimooka, "After the Pandemic: Confronting a New Geo-Strategic Environment in the Post-COVID-19 Era," Macdonald-Laurier Institute, 2020: 22.
68. For a recent account, see Ezra Levant, "China Virus," Rebel Media, 2020; see also Raymond de Souza, "Not the Usual Diplomatic Prattle," *National Post*, June 26, 2020.
69. Steven Chase, *Globe and Mail*, April 2, 2020. In this context, see the remarks of Terence Corcoran, "Surviving the CLICHÉ-19 Pandemic," *Financial Post*, May 12, 2020.
70. According to the *New York Times*, August 19, 2020, American intelligence agencies believe that Chinese officials in Wuhan hid the initial outbreak from the central leadership in Beijing for several weeks in January. German intelligence, on the contrary, concluded that Chinese president Xi Jinping asked the WHO on January 21, 2020 to suppress information regarding inter-human transmissibility and the possibility of a global pandemic. See Fahrion, et al., *Spiegel-Politik*, May 8, 2020. Whether the orders to hide the information about the Wuhan epidemic originated in Beijing or elsewhere seems to us to be a secondary detail: Chinese officials were responsible. The next day, Maria van Kerkhove, head of the WHO's emerging diseases unit, still maintained it was "rare that an asymptomatic person actually transmits onward to a secondary individual." That was obviously untrue and everyone outside the WHO knew it.

