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Making & Doing

Activating STS through Knowledge Expression and Travel

Edited by: Gary Lee Downey, Teun Zuiderent-Jerak

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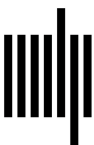
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1

STS ON THE STREET AND AT THE COURT

Interlocutors in the Taiwan RCA Collective Occupational Disease Lawsuit

Yi-Ping Lin and Hsin-Hsing Chen

Yi-Ping Lin [林宜平] clearly remembers the day she first attended the advisory group meeting at the Legal Aid Foundation and the day she first stepped into the courtroom. She had just moved to the newly founded Institute for Science, Technology and Society at National Yang-Ming University from her previous job at the National Taiwan University (NTU) College of Public Health. From her earlier participation in public health studies of the RCA (Radio Corporation of America) case, she had published an article criticizing RCA health effect studies from a feminist perspective (Lin 2006). Hsin-Hsing Chen [陳信行] and his colleague Cheng-Liang Chen [陳政亮], both active in the labor movement and the burgeoning STS community in Taiwan, went to Yi-Ping's office to invite her into the academic support work for RCA workers. Later joined by Paul Jobin, a French sociologist working in Taiwan, they became the core of the RCA workers' advisory group. Since 2005, RCA's Taiwanese workers had been suing their former employer and its parent companies, seeking compensation for cancer and other serious diseases they believed to have been caused by their exposure to toxic chemicals at the workplace during the erstwhile global electronic giant's operation in Taiwan between 1970 and 1992. After years of procedural hurdles, the Taipei District Court finally started hearings on substantial matters of the case in September 2009.

Hsin-Hsing was curious about what kinds of material Yi-Ping had that could be useful for the workers' case. It turned out to be a lot. Yi-Ping pulled out two boxes from under her desk. One contained a complete photocopied collection of the magazine *RCA Family* [RCA 家園], which was published by RCA Taiwan and circulated among its workforce during its operation from 1970 to 1992. Another included a complete collection of reports of epidemiological and toxicological studies commissioned by Taiwan's Ministry of Labor and its Environmental Protection Agency and done by the NTU College of Public Health and other institutions. Perhaps most

importantly, Yi-Ping knew many public health and environmental science experts who would love to help but didn't know how to start.

Active in the environmental and labor movement since his college days, Hsin-Hsing practically grew up in the Taiwanese social movements of the 1980s. He was familiar with the context for why socially concerned scientists, such as Yi-Ping's friends in public health, felt frustrated. Resistance toward technocratic authorities is an integral part of contemporary social movements in Taiwan, and scientific-sounding words are often regarded by protesters on the street as on the side of the authorities, hence mistrusted. Professionals might be welcomed to support one social cause or another with their prestige, but they often found it more difficult to contribute directly with their scientific knowledge.

It was no coincidence that the first effective opposition party founded during Taiwan's three-decade-long martial law regime chose green as its party color. It was 1986. The Chernobyl disaster had just taken place in the Soviet Union. In the wake of the disaster, grassroots antipollution protests erupting in Taiwan, including an antinuclear campaign that continues to this day, often featured farmers and workers questioning the technocratic decision-making in the state and calling out the condescending attitude of the technocrats toward the great unwashed. Scientific knowledge lives at the center of a democratic sensibility emerging at this conjunction.¹ On one side of the barricade, there was the state and a growing rank of highly educated technocrats who believed they possessed the scientific truth and technological superiority. On the other side were common folk who felt there was definitely something wrong with the environment in which they lived and worked but lacked the means to articulate it.

Despite the purported ideological opposition between the right-wing regime of Taiwan and its communist counterparts in the world during the Cold War, they share the characteristics of strong technocratic developmental states. Inviting high-tech companies such as RCA to invest in the country and use the cheap and docile workforce for labor-intensive export-processing industries, Taiwan became one of the conspicuous newly industrialized economies alongside South Korea, Singapore, and Hong Kong. Indeed, many of the central figures in Taiwan's famed semiconductor industry today started their careers from a collaborative training program sponsored by the Taiwanese government and RCA in the 1970s. Advanced technological companies like RCA were not supposed to poison their employees, according to the mind-set prevailing during Taiwan's decades of rapid economic growth.

In this context, former employees suing RCA for their occupational diseases also indict this piece of recent history in our country. Moreover, since the developmental model of export-oriented industrialization has become so prevalent in the post-Cold War world, companies doing business as RCA did in Taiwan—for example, Foxconn, Samsung, or Huawei—may very well be exposing workers in far corners of the world to the same hazards as the Taiwanese workers had endured. Thus, the campaign

against RCA is, at the same time, a call to attend to one of the pressing matters facing workers in high-tech sectors today.

In order to sue RCA, however, the workers needed scientific expertise to translate their personal experiences into observable collective facts, and they needed legal expertise to articulate the facts. We had to find a way to bring the public health researchers that Yi-Ping had been working with into the workers' campaign and help them work with lawyers, activists, and the victims. Otherwise, there would be no legal case to fight at all.

Former RCA employees had been organizing and campaigning since 1998, after it was disclosed that the company had been illegally dumping hazardous organic solvents on the plant site during its operation in Taiwan from 1970 to 1992. Former employees and their families held many street protests to compel the government to do something about the alarmingly high rate of cancer found among fellow workers. Hsin-Hsing helped out in this wave of organizing, because the major organizers of the workers had been his fellow activists back in the 1980s.

The newly democratized state did want to do something. However, RCA claimed that all their operational records had been destroyed by a fire after the plant closure, and the government said it could do little without direct evidence of whatever had gone wrong with RCA. To have their grievances heard and redressed, RCA workers could not rely solely on street protests to win over public opinion and demand political will from the administrative branch of government. The judicial system, itself undergoing constant reforms since democratization, thus became the focal point of the RCA workers' campaign.²

The RCA workers' collective civil lawsuit against their former employer and its foreign parent companies was eventually taken over in 2005 by the Legal Aid Foundation, an independent public institution established the previous year in response to a long-standing judicial reform movement. Volunteer lawyers representing the workers faced a daunting task. This was the first collective civil lawsuit in the country, and every step would establish legal precedent. Furthermore, the lawyers faced complex and uncertain scientific evidence. It takes the craft of STSers to make the scientists and lawyers talk to and understand each other and work together to make coherent arguments. STSers, after all, have been explicitly trying to cross disciplinary boundaries in their inquiries for decades—from philosophy of technology to ethnography in the laboratory—and there is a whole body of accumulated experience on how this boundary crossing works or fails to work. The advisory group meeting attended by the lawyers, plaintiffs, activists, and academic advisors, including Hsin-Hsing and Yi-Ping, became the place for collective struggles to achieve mutual understanding. Since they started going to the meetings in 2009, reading and discussing scientific papers with lawyers, and sitting in the spectator seats during the RCA trial have become a shared memory of Yi-Ping, Hsin-Hsing, and the STS community in Taiwan (H.-H. Chen 2011a; Lin 2018).

Even after a partial victory for the workers at the Supreme Court in August 2018, trials on this most science-intensive lawsuit in the judicial history of Taiwan still continue into the tenth year, because a portion of the case was remanded back to the high court for a retrial. The second high court in March 2020, however, was a major setback; only twenty-four victims were compensated. The case was moved into the Supreme Court once again. Meanwhile, after the first district court victory of the workers in 2015, a second group of more than 1,100 plaintiffs filed another collective lawsuit. Taipei District Court has found in favor of the workers again and awarded another record-high compensation of 2.3 billion Taiwan dollars to the collective of 1,115 plaintiffs.³ The volunteer work of Taiwanese STSers continues as interlocutors among scientific witnesses, lawyers, activists, and workers.

A COMMUNITY AFFAIR

The first time Yi-Ping sat down in court in 2009, the very first witness in the case was being heard. Former RCA worker Hwang Chun-Tiao (Ah-Tiao) [黃春窕(阿窕)] was undergoing cross-examination at the Taipei District Court. It was Yi-Ping's first time stepping into a courthouse. She couldn't tell the difference between criminal and civil courts and immediately got lost inside the building. When she entered the courtroom, the defense lawyer for RCA was asking Ah-Tiao at what age her grandmother and grandfather had died and their cause of death. Yi-Ping knew that although the lawsuit would likely take a long time, the company lawyers were asking the wrong questions right from the start.

Ah-Tiao was a dream witness for the workers' case. Her father, mother, grandfathers, and grandmothers all had lived to nearly a hundred years of age, and none of them ever had cancer. She did not smoke or drink alcohol. When the presiding judge asked her why she thought her nasopharynx cancer was related to her work at RCA, she replied that when she worked on the wave soldering machine, the soldering pan emitted a pungent smell. She often got a nosebleed when she opened the door of the machine and smelled the sharp odor. So when she was diagnosed with nasopharynx cancer, she immediately thought about her experience on the RCA shop floor. Ah-Tiao spoke very slowly. Radiological therapy on her cancer had made it difficult for her to speak clearly. Even so, it was dead silent in the courtroom when she spoke.

Yi-Ping wiped her tears away and, in that moment, decided to stay with the victims and keep sitting in at the court sessions. The lawsuit would last a long time. Yi-Ping and Hsin-Hsing rarely missed a court session.

Regular attendees of the court sessions included the RCA workers; occupational health and safety activists from the Taiwan Association for Victims of Occupational Injury (TAVOI), who had been helping to organize the campaign since 1998; and students from STS, public health, sociology, law, and social transformation studies. Court observation became part of many professors' syllabi after the trial began in

2009. Where else can you see science, law, and society engage with each other in the same room?

You cannot take pictures or record sounds inside the courtroom. Although the court always reserves dozens of seats for the media, the RCA case has been going on for so long that it is no longer news. Hardly any reporters have appeared to watch the court sessions in all these years, except for the brief moments of final debates and verdicts. So there has been no way to see through the media how the litigation is going. The only way to see the progress of the case is to go to the courthouse and watch the duel of scientific arguments unfold in slow motion. Thus, we encourage students to attend the sessions. Sociology students from Tung-Hai University in Taichung even hire a bus and come to the court sessions en masse.

Reactions to the proceedings vary greatly from one STSer to another. All are genuinely curious about people and things inside the courtroom. Some complain that the court clerk types too slowly in order to slow down the proceedings. Others are curious about how and when PowerPoint slides became integrated into court proceedings. Still others have started to research why there is a permanent seat for a translator in the court settings.⁴

The Chinese-language STS journal *Taiwanese Journal for Studies of Science, Technology and Society (STM)* published a special issue (number 12) on the RCA controversy in 2011. (C.-L. Chen 2011; H.-H. Chen 2011b; Jobin and Tseng 2011; Lin 2011). Since the journal's founding in 2001, this is the only issue that sold out all printed copies. Almost every academic and student volunteer for the RCA case obtained a copy of it. It even made its way onto the defense lawyers' desk in the courtroom. After the final debate of the district court trial in 2014, *STM* also published in its "Issues and Discussion" section a series of short articles based on court observations of the RCA trial.

After every session, a group photograph is taken in front of the courthouse. The RCA workers, together with the lawyers, TAVOI organizers, academics, student volunteers, and other supporters stand together and take a snapshot. From the cold of winter to the heat of summer and back to winter again, and from the Taipei District Court to the Taiwan High Court to the Supreme Court and back to the district court (with the second group of plaintiffs). There are enough of these courthouse snapshots to make an impressive collage or an entire photo exhibition.

In addition to attending proceedings and writing articles, STSers in Taiwan have also held press conferences, published op-ed pieces, and done other more "regular" interventions of the sort that intellectuals usually do regarding this or that social event. Working with TAVOI, some STS scholars helped organize a collaborative project that led to the book *Voices Refuse to Be Forgotten*, an oral history of Taiwan RCA workers (TAVOI and MAA 2013). This book won a Golden Tripod Award from the Ministry of Culture in 2014 for best nonfiction book. The documentary *Delayed Justice: The RCA Lawsuit*, funded by Taiwan's Ministry of Science and Technology and

with active participation of several members of the Taiwan STS community, won an STS Making and Doing Award from the Society for Social Studies of Science and an award from the Taipei Labor Film Festival in 2018. The eight-episode documentary won the 2019 Golden Bell Award for best science documentary TV program. STS scholar Harry Wu [吳易叡], himself a musician on the side, wrote the song “Spring-time” for RCA workers prior to the final 2014 debate at the Taipei District Court. Faculty and students at National Yang-Ming University, NTU, and Chang Gung University rehearsed the song and performed it that day as a chorus in front of the courthouse. This community has many talents.

COMMENTATOR OF A SLOW-MOTION BALLGAME

“Attorney Lin has pitched the ball! Let’s see how it goes!” yelled Hsin-Hsing, sitting with dozens of former RCA workers in the basement cafeteria of Taiwan High Court. “The lawyers and advisors prepared this ‘ball’ two weeks ago,” he went on to explain. Epidemiological questions in the cross-examination of an expert witness at court were sent flying like a ball in a game.

The cafeteria was an ad hoc arrangement made for this most unusual case. In most cases, few people would sit through those long and tedious court sessions as spectators. The main courtrooms are too small to fit even a portion of the more than five hundred plaintiffs. But the RCA case became an exception beginning with the hearing on substantial matters at the Taipei District Court in September 2009. Many plaintiffs insisted on being present, coming to the court and sitting patiently for hours through the sessions. They kept doing this even after both sides appealed to the high court. The high court administration decided to accommodate them. It designated the cafeteria as an extension courtroom and let the former workers and families watch the court proceedings through live streaming.

As a rule, speaking from the audience at court is strictly forbidden, and the extension courtroom is no exception. But the bailiffs of the high court had seen these well-behaved aunties and uncles so many times that they didn’t bother to shush people anymore. Also, they recognized that the “commentators” were helping the former workers and families to understand what was going on. Cross-examination of expert witnesses was especially like ballgames, with lawyers of the opposing side throwing questions and expert witnesses trying not to give answers that would make them look ignorant, deliberately biased, or otherwise untrustworthy.

The gist of the “game” was to make these Q&As clearly intelligible to the panel of judges, whether the topic was environmental engineering, epidemiology, toxicology, health risk assessment, or other scientific issues concerning how industrial chemicals affect human health. If one side confused the judges by using too much scientific jargon, that side risked losing the judges’ “*intime conviction*” and thus the case.⁵ Explaining what the “ball” was to the plaintiffs in the basement cafeteria became,

therefore, an essential aspect of the STSers' work in this collective litigation. Beyond their expertise in law, judges were, after all, as much laypersons as the RCA workers, activists, and volunteer lawyers with respect to the scientific evidence. If, by working with the volunteer scientists and lawyers in our meticulous preparation for the court sessions, STSers like Hsin-Hsing and Yi-Ping could help the workers understand the debate, surely the workers' lawyers could make the judges understand and feel the presence of knowledgeable plaintiffs at the same time.

Unfamiliar scientific content is not the only reason a commentator is needed to help viewers understand. The excruciatingly slow pace of the typical civil law proceeding effectively decreases any dramatic element in the trial and makes the court proceeding opaque even while it is open to the public to watch. Although it takes only a split second to tell whether an actual ball in a game scores or not, it usually takes more than half an hour in a typical cross-examination in the RCA trial. And it requires a time-lapse camera, or a commentator, to make the dynamics visible to people who are not familiar with the scientific and legal issues contested at court (H.-H. Chen 2014; Merryman and Pérez-Perdomo 2007).

After Hsin-Hsing yelled that day that the attorney had pitched the ball, he took some time to explain what the ball was this time. Inside the courtroom, during the thirty minutes or so after the plaintiffs' lawyer asked a question, the witness might ask the lawyer to repeat the question, the defense lawyer might object, the presiding judge would quiet the crowd and ask all to remain calm, and so on. Then the expert witness would carefully read paragraphs from a journal article (usually in English, with Chinese translation) or other reference material that the lawyers had presented as appendixes to the question, give a partial answer to the question, complain that the translation was inaccurate, give another partial answer, and so on. And the presiding judge would negotiate language with lawyers for both parties and the witness her- or himself and then dictate an answer that was worded to the satisfaction of all parties. Last, the court clerk would type the dictated answer into the court record. Now it became official.

On this day, the commentator in the basement cafeteria announced that the witness had been cornered and had given a bad answer. The response was similar to what we had anticipated two weeks earlier when we helped the plaintiffs' lawyers write this set of questions in long preparatory meetings over the weekend. And then, the commentator shouted, "Score!" The audience cheered, briefly, and then returned to their good manners and patient watching.

CATCHER IN THE OUTFIELD

While Hsin-Hsing was playing the commentator role in the basement cafeteria cum extension courtroom, Yi-Ping was sitting in a corner of the main courtroom, feeling like a baseball fan on the outfield grandstand with a glove on her hand, waiting to catch a foul ball coming her way. But instead of a glove, she was holding a

smartphone, texting back and forth with the workers' lawyers at the bar. Sometimes there would be another volunteer sitting in front of a computer in the NTU College of Public Health building and with ScienceDirect or other scientific literature databases on-screen, ready to do a search on real-time demand from Yi-Ping.

The expert witness sitting in the dock that particular day was Dr. Pei-Fung L. Hurst [劉碧芳], one of the high-priced expert witnesses from the United States retained by RCA. She is a Taiwanese American with a joint PhD in epidemiology and virology. Formerly employed by the US Environmental Protection Agency, she was now working for an environmental consulting firm. She was said to have experience in health risk assessment with some background in toxicology.

The cross-examination became stuck at one issue: the "slope factor" of carcinogens, which regulatory agencies use in their health risk assessment protocols. It is used to estimate the probability of someone developing cancer after being exposed to a carcinogen. Take, for example, trichloroethylene (TCE), the major toxic chemical found in the groundwater at the site of RCA's former Taoyuan plant. It had previously been classified as 2A, or "probably carcinogenic to humans," by the International Agency for Research on Cancer (IARC). But in 2012, IARC upgraded it to Group 1, or "carcinogenic to humans," citing a large number of scientific reports over the past two decades. The question: Do regulatory agencies change TCE's carcinogenic slope factor once this kind of reclassification happens?

"Would health risk assessments using the older slope factor underestimate the health risk to humans posed by TCE at the RCA plant?" asked Attorney Tsai on the plaintiff's side.

"No," replied Dr. Hurst. "The way IARC classifies carcinogens is not the same as the way risk assessments estimate the additional risk of cancer."

A nasty surprise! We were expecting her to answer "yes" and step into a trap when we prepared this question. Was this going to be a moment when RCA scored during our cross-examination?

"Ask her about USEPA [the US Environmental Protection Agency], not IARC," Yi-Ping texted to the plaintiffs' lawyers. And it worked.

Minutes later, Attorney Lin, the head of the plaintiffs' lawyers, asked to rephrase the question: "Is it true that USEPA reclassified TCE in 2011 as a Group 1 'human carcinogen' and accordingly changed the slope factor of TCE in its health risk assessment protocol?"

Dr. Hurst replied, "I know TCE was reclassified in 2011 and the slope factor of TCE was updated. However, . . ." Well, the rest of the reply doesn't matter anymore. She said yes now. RCA workers were indeed subjected to a higher risk of cancer than studies had previously suggested.⁶

After the session adjourned and everybody came outside the courthouse for our group photo of the day in the gathering dusk, Yi-Ping waved excitedly to Hsin-Hsing. She said, "I've caught a foul ball!"

EXAMINING AND CROSS-EXAMINING EXPERTS

In the proceedings of the RCA trial, every expert witness is first asked a series of questions in direct examination. This list is submitted to the court by the party who called the witness. Typically, the presiding judge does the asking. Then, attorneys for the opposing party ask their questions in cross-examination. Each phase usually takes two to three days, and they are scheduled one week apart so that both the lawyers and the expert witness have ample time to prepare. Surprise is not a valued feature of the typical civil law court.

Courts in Taiwan generally recess between noon and 2:30 p.m. The lawyers for RCA and their expert witness from the United States usually went to a TGI Fridays restaurant for an American-style lunch. Those for the plaintiffs usually went directly from the courthouse to the NTU College of Public Health. There they spent the two and a half hours discussing what took place during the morning session, conducting urgent searches online, and preparing a strategy for the afternoon session. On many days they would not have time to finish even a simple lunchbox before returning for the afternoon session. During many weeks, the days felt very much like a perpetually extended ballgame. Yet there were memorable moments of straightforward duels and dramatic turning points. August 1, 2013, became one such day.

Professor Pau-Chung Chen [陳保中], testifying on the side of the workers, was grilled the entire morning on the issue of the “healthy worker effect.”⁷ The defense lawyers asked him to give documentary evidence explaining why the healthy worker effect should be expected to produce a 20% markup in observed incidence or mortality rates. During the two-and-a-half-hour lunch period, Professor Chen carefully read over the scientific journal articles provided by the defense lawyers as appendixes to their question. He found in them the answer. Toward the end of the afternoon session, Professor Chen stated to the court that, on page 1 of the defense’s appendix 6, it clearly says, “Background occupational studies typically observe a 20% [underestimation due to healthy worker effect].” After a lengthy negotiation, this statement made it into the court record of the day. In addition to affirming the “healthy worker effect,” it demonstrated to the court that counsel for RCA had paid little attention to the documents they had submitted to the court.⁸

In addition, on the morning of August 8, the defense attorneys submitted a one-page document to the court. They then demanded that Professor Chen translate it from English to Chinese on the spot, sentence by sentence, and confirm the translation to the court. The document reported that, in the polluted groundwater at the site of US Marine Camp Lejeune in South Carolina, there was “limited evidence” showing incidences of various cancers related to the presence of TCE, tetrachloroethylene, benzyne, and vinyl chloride. The professor dutifully did what the defense asked. However, by that afternoon we had printed out the entire report, more than three hundred pages, and submitted it to the court. Professor Chen then called the

court's attention to the fact that this study had been done by the US National Academy of Science with funding from the US Department of the Navy—the accused party in the Camp Lejeune controversy. He then explained that the Centers for Disease Control in the US Department of Health and Human Services had already published an open letter protesting the bias in this study.

Cross-examination of an expert witness called by the defense was far more challenging to the advisory group than direct examination of witnesses called by the plaintiffs. We have much more time to prepare for the latter with help from our experts. In cross-examination, however, the plaintiffs' lawyers have to quickly and correctly grasp what was presented in direct examination and then respond promptly. Expert witnesses called by RCA from across the Pacific Ocean stay in Taiwan for only two weeks. More days means more expenses paid by the company. Cross-examination has to be ready in one week following the direct examination. Not only do we have to have the list of questions ready and submitted to the court before the sessions; we also have to compile the stack of appendixes. And if the appended scientific articles are in English, we have to translate them into Chinese before submitting them. Many memorable sleepless nights for the RCA case have been spent preparing for the cross-examination of expert witnesses, with plaintiffs' lawyers, assistants, scientists, STSers, and student volunteers all working together.

These efforts paid off. With painstaking preparation on the side of the plaintiffs' lawyers in cross-examination, the first expert witness RCA called at the district court trial, a Taiwanese American radiation oncologist at a UCLA hospital, turned out to be a fiasco for them. So much so that district court verdict states in unusually harsh tone that

the court can therefore understand that Dr. Steve Lee [李百勛] was deliberately trying to mislead the court by double talk, word games, and using the so-called hypothetical statement in his comment. All through his testimony, he was fully aware that [the plaintiffs' arguments] are based on IARC monographs, that trichloroethylene (TCE) has been classified by IARC as a Group 1 carcinogen and tetrachloroethylene (PCE) has been classified as a Group 2A carcinogen, and that both chemicals may cause cancer in the human body. The content of the expert report submitted by Dr. Steve Lee is thus not qualified to be considered by the court.⁹

We may never know how much the anger at a purported scientific expert witness trying to mislead them weighed in the deliberation of the three-judge panel at the district court, which eventually ruled in favor of the workers. We do know that the workers' lawyers and advisors like us learned to treat every bit of expert testimony and every court session seriously. To the extent it sometimes feels like a ballgame, it is a ballgame we play with passion.

As exciting as these quick back-and-forth responses were in the midst of the slow-motion movements of the court proceedings, what was most exhilarating for Yi-Ping was to see the issue of science and gender surface and be discussed formally in court.

On August 1, 2014, the prominent public health scientist and leading advocate for victims of RCA's toxic exposures, Professor Jung-Der Wang [王榮德], testified on behalf of the workers. By the end of the morning session he had been questioned repeatedly by the defense lawyers about cancers from TCE exposure. The IARC reporting had indicated that the most likely cancers resulting from TCE exposure are kidney and liver cancer. Yet research on the Taiwan RCA workers had found a large number of breast and cervical cancers. How could one possibly say, then, that cancers among RCA workers are caused by TCE?

Professor Wang tried to answer by reiterating again and again that exposure to organic solvents such as TCE can cause a whole series of different cancers. He emphasized the factor of "competitive cause of death." In other words, someone who dies of kidney or liver cancer could not die later of breast cancer. But the point did not seem to work very well to deflect the RCA lawyers' questioning.

During the lunch break at the NTU College of Public Health, Yi-Ping reminded Professor Wang that international studies on occupational exposure of TCE are mainly done on populations of male workers, tracking their long-term health outcomes. Naturally, these studies would not find breast and cervical cancers. That afternoon, Wang led the defense lawyers through IARC's list of occupational epidemiological studies on TCE, looking for the variable of sex. They were forced to acknowledge that the studied subjects have indeed been predominantly male. The lack of systematic study of women workers clearly explained why the predominantly women workers at RCA could not find published scientific evidence connecting their illnesses to the chemical exposure they had collectively experienced.

The Taiwan STS community has long made gender and science and technology a central concern. Her interest in and concern for the health of women workers is also what led Yi-Ping to initiate research on RCA in the first place. She has long been a vocal critic of the gender blindness of epidemiology, toxicology, and health risk assessment. Although the gender issue rarely came out explicitly during the trial as a compelling source of evidence, on that afternoon in the courtroom and with a simple nudge, the RCA lawsuit had entered the inner workings of science and started talking about gender.

KEEP ON AND SPREAD OUT

The high court verdict on the RCA case asserts that the company had been using at least thirty-one toxic chemicals. These chemicals are deemed likely causes of sixty-five types of cancers by such authoritative scientific and regulatory bodies as IARC, USEPA, and US Centers for Disease Control and Prevention, drawing on both epidemiological and toxicological modes of evidence. All plaintiffs who are diagnosed with or have died of any of these sixty-five cancers are eligible for compensation from

RCA and its parent companies. Recognizing the multiplicity of causation became significant progress in itself. In most real-life situations, victims of toxic exposures throughout the industrial world are exposed to mixtures of hazardous chemicals. The so-called one-molecule-one-disease model had often worked against victims when they tried to seek redress for their suffering.

The Supreme Court verdict of August 2018 upholds most of the high court decisions on the difficult legal questions of causation, burden of proof, and statute of limitations. It also pierced the corporate veil by holding foreign parent companies jointly and severally liable for wrongdoing as their local subsidiary. This means that a total amount of approximately 564 million Taiwan dollars (US\$18.3 million) in compensation to 262 dead and seriously ill victims is set and final. However, the Supreme Court verdict also questions the high court's reasoning for awarding damages to 246 plaintiffs who have not yet been diagnosed with serious illnesses. The high court's 2017 ruling stipulated that, even without outward expressions of harm, "subcellular-level damage" has occurred when a person is exposed to known carcinogens. The Supreme Court remanded cases of some 200 such plaintiffs back to the high court for a retrial.

The RCA case has set many records in the legal history of Taiwan. It has the largest number of plaintiffs, largest amount of damages awarded (although still meager compared with the norm in other industrialized countries), most complex scientific evidence, and greatest number of expert witnesses and length of scientific expert testimonies at court. This accomplishment of STSers in Taiwan was achieved in close and extended collaboration with the organized victims, social-movement activists, lawyers, scientists, and many student volunteers. These experiences have become integral to the formation of the STS community in Taiwan. The case has successfully demonstrated that occupational diseases, such as those at issue in the RCA case, raise questions and concerns similar to those in environmental pollution and food safety, even though the latter often receive much greater public attention (H.-H. Chen 2016). The important collaborations in the case have started to bring about much needed changes in civil court procedures, the labor and environmental movements, and we hope, science as usual as it lives in the realm of public health.

ACKNOWLEDGMENTS

We would like to thank all of the victims, activists, lawyers, and volunteers of all kinds, including scientific expert witnesses, for their perseverance over the years in the RCA campaign and lawsuit. We also are grateful for the warm, collegial support of the Taiwan STS Association and the research funding provided by the Ministry of Science and Technology of Taiwan. Our collective endeavor would not have gone this far without those combined efforts.

NOTES

1. The translation of journalistic work on technological disasters such as Chernobyl and Bhopal played crucial roles in shaping such a sensibility in Taiwan in the 1980s when it was still under stringent censorship. The translation of Ives (1985) is one prominent example. Two translators of that anthology later became leading figures in the Taiwan STS community.
2. See Wang (2008) for a brief introduction to the judicial reform movement in Taiwan since the late 1980s.
3. See Tsai (2019) for a summary of the district court verdict for this second group of plaintiffs.
4. A short answer to this is that in 1912, when the legal system of the Republic of China, which Taiwan has inherited now, was established, most Chinese didn't speak the official language, Mandarin Chinese. Having puzzling remnants is probably common among countries with a colonial or imperial past.
5. The French phrase "*intime conviction*" is often used to describe the central criteria of the evidentiary law in the civil law (Continental law) tradition, which the legal system of Taiwan has largely inherited. It refers to the state of mind of the judge who believes that the facts used to determine the verdict are actually true. See, e.g., Engel (2008).
6. Court record of the Taiwan High Court for the session starting at 2:00 p.m. on March 31, 2017, in the civil tort lawsuit 104 Zhong-Shang No. 505, 5–6 (臺灣高等法院104重上505號侵權行為訴訟, 106年3月31日下午2時言詞辯論庭筆錄, 第5–6頁).
7. Many epidemiological studies of occupational diseases take into consideration the "healthy worker effect." Workers usually exhibit lower overall rates of death and serious diseases than the general population because the severely ill and chronically disabled are ordinarily excluded from employment. The incidence ratio of a certain disease observed among a group of workers should therefore be given more weight when compared with the same rate among the general population. In his testimony, Professor Chen stated that contemporary studies of occupational health often use a 20% markup to take into account the "healthy worker effect."
8. Court record of Taipei District Court for the session starting 2:40 p.m., August 1, 2013, for 95 Zhong-Su-Geng-Yi No. 4 Civil Tort Lawsuit, p. 16 (台北地方法院95重訴更一第4號民事侵權訴訟, 102年8月1日下午2:40準備程序庭筆錄, 第16頁).
9. Taipei District Court 95 Zhong-Su-Geng-Yi No. 4 Civil Verdict, p. 107 (台北地方法院95重訴更一第4號民事判決, 107頁).

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