

Disruptive Silence: Air-Raid Sirens and Holocaust Remembrance in Israel

Yaron Jean

April 16, 2015 was a special day for Mrs. July Salmanowitz. Mrs. Salmanowitz was born in 1929 to a Jewish family in Czechoslovakia and was 15 years old when the *Wehrmacht* marched into her home town of Munkács. After facing the horrors of wartime Europe, Mrs. Salmanowitz discovered that her whole family had perished in the Holocaust. 70 years after the war, she was given the spectacular opportunity to participate in engaging with the public memory of the Holocaust in the State of Israel where she had found her new home after the establishment of the country in 1948. As the last survivor of her family, Mrs. Salmanowitz was invited to be a guest of honour at the headquarters of the Home Front Command (HFC) of the Israel Defence Force (IDF). Surrounded by journalists as well as men and women in uniform, her task was to press the red button which activated the air-raid siren system throughout the country. It was 10am, and the two-minute-long blare of air-raid sirens announced the opening ceremony of the annual *Yom Hazikaron laShoah ve-laGvurah*, the Holocaust and Heroism Remembrance Day.¹

The Holocaust Remembrance Day (as it is most often referred to) was first inaugurated in 1953 and is solemnized every year on the 27th of the

Yaron Jean (PhD.) teaches modern history at the Sapir College, Negev. He is the author of *Noises of Modernity: Hearing Experiences in Germany 1914-1945* (Heb.), (Tel Aviv, 2011) and *Portable Identities: Travel Documents and the Question of Stateless Refugees in Europe between the Two World Wars*, (Vandenhoeck & Ruprecht, forthcoming 2019) [Eng.] His publications on the history of sound further include “The Soundmindedness of the Great War: Viewing History through Auditory Lenses,” in: Feiereisen Florence and Hill M. Alexandra (ed.) *Germany in the Loud Twentieth Century. An Introduction* (Oxford University Press, 2012); “Silenced Power: Warfare Technology and the Changing Role of Sounds in Twentieth-Century Europe,” in: *Studies in Contemporary History*, 8, 2011; “Droning Airplanes and Reversed Memories: The Historiosonic Vocabulary of the Air War Over Europe in the Second World War,” in: Meier R. (ed.) *Acoustic Memory and the Second World War*, (Vandenhoeck & Ruprecht, 2010); and “Destruction out of Silence: Non-Diegetic Sounds, Drones and the Natural History of Aerial Warfare,” in: Bründel Stephen and Frank Estelmann (ed.) *Disasters of Violence, War and Extermination 1815-2015*, (Transcript Verlag, 2018).

¹ “Meragesh: HaNitzola Hifilah Et Zfirat Yom HaZikaron LaShoah” [Moving: The Survivor Operated the Memorial Siren of Holocaust Remembrance Day] in: *Maariv Daily Newspaper*, Online Version, 16.04.2015; facebook of Israel Defense Force Spokesman, 16.04.2015

Jewish month of *Nisan* (April-May). To account for the differences between the Jewish and Gregorian calendars, the ceremony usually takes place eight days before *Yom Haatzmaut*, Israel's Independence Day. The day of commemoration for the victims of the Holocaust begins at sundown. On the following day, at 10am, a two-minute siren is heard throughout the country. During the siren, the entire population is required to observe the memory of the victims by abandon whatever one was doing right then. Instead of looking for shelter—as one would be expected to do upon hearing the sound of an air-raid siren—one is expected to freeze in place as part of a collective standstill. As the sound of the siren slowly fades away, the country gradually comes back to life as after an all-clear signal in times of war.²

The participation of Holocaust survivors in operating the above-mentioned air raid system in the Holocaust Remembrance Day is a rather new gesture in the politics of commemoration in Israel. Since its beginning several years ago, it represents a further step in what Alison Landsberg so poignantly called “prosthetic memory”, namely the ability to add a gesture or act which did not exist within the original event, but which in time became an organic part of the established tradition (Landsberg, 2004). Moreover, such kinds of active participation added a new stage to the effects of remembrance, and further consolidated what Sally Moore and Barbara Myerhoff described as a secular ritual.³ Continuing this line of thought, this article will explore the performativity of air-raid sirens and their use for the purpose of actively commemorating the Holocaust in Israel. It assumes that the performativity of air-raid sirens, and their use as goal-directed acoustic symbols in times of emergency, achieves within the Israeli culture of hearing two major goals: First, it elaborates the state monopoly over public sound and its legitimate uses, since this monopoly plays an important role within the politics of memory by promoting the idea that one sound equals one memory. Second, it analyses the subtle interplay between warning sounds in the present and traumatic memories. My assumption is that sounds—and above all the unpleasant blaring sounds of air-raid sirens, which are strongly associated with the fear of war—create an epistemological symmetry between the dangers faced by Israel in the present, and the dangers faced by non-Israeli Jews in the past. Thus, the unpleasant sound of the air-raid siren not only serves as a powerful acoustic agent for the active commemoration of a traumatic past, but also fuels its unpleasant memory up to the very present, thus creating what Seeberg, Levin and Lenz have called an “active memory” (Seeberg, et al. 2013). The sound of the air-raid siren makes the act of commemoration into an organized public activity triggered by sound and based

² Since the fall of Communism, the use of air-raid sirens for the purpose of public commemoration has been found in Poland as well: every August 1st at 5.00 PM, a one-minute siren is heard in Warsaw. The sound is meant to commemorate the fallen of the Warsaw uprising against the Nazi occupation, which began with the Polish resistance home army (*Armia Krajowa*) on August 1st 1944.

³ Moore F. Sally and Myerhoff G. Barbara (Hg.) *Secular Ritual*, Assen: Van Gorcum, 1977. Chp. 1

on an accumulative link of anxiety and fear which binds the non-Israeli Jewish past with the Jewish-Israeli present. However, in so doing the sound of the siren paradoxically achieve the opposite as well. Its deliberate call for a commemorative action upon hearing the signal also seem to wake private and counter memories to counterweight the national hegemony. Subsequently, the “elephant in the room”⁴ to use the brilliant metaphor of Eviatar Zerubavel for describing the entanglement of past traumas in Israel’s present seems to develop into a mammoth that casting its shadow on almost every public and private sphere in the country.

In elaborating this point, I briefly present the history of the air-raid siren and how it turned into an acoustic signal of danger in the modern state. This is followed by a short description of how the memory of the Holocaust was institutionalized in Israel as a national memory. My analysis explores to what extent sound, and above all air-raid sounds, played a significant role in drawing a direct link between the Holocaust and the modern Israeli politics of memory.

The Secular Song of the Siren

The story of the air-raid siren as a public sound stretches back to early nineteenth-century Europe. In 1819, a French engineer named Charles Cagniard de la Tour (1777-1859) sought ways to produce ultrasonic waves in the laboratory. At that time, there was no technology capable of this; so he built an instrument which produced a jet of air directed at two high-speed rotating discs mounted with spaced holes. The machine produced a strident sound in the space between the two discs. Because of the technological limitations of that era, de la Tour was unable to experimentally subject his new sound device to an airflow; instead, he took advantage of earlier experiments with a jet stream of liquid. Because he was so fascinated by the fact that his new instrument could produce piercing sound waves underwater, he decided to nickname it “le Sirène” after the well-known song of the sirens from Homer’s *Odyssey*.⁵

However, the civil use of sirens did not restrict itself to the laboratory. The ability to produce high-pitched sounds gradually found commercial uses in Europe and the United States; the fact that the sound of the siren was unlike any known sound at the time, led to the idea of employing it as an acoustic warning device in circumstances of low-visibility conditions. In German culture, in which time and its measurement came to be a key ele-

⁴ Zerubavel Eviatar, *The Elephant in the Room: Silence and denial in Everyday Life*, Oxford/New York: Oxford University Press, 2006, p. 11.

⁵ “Cagniard de La Tour, Sur la Sirène, nouvelle machine d’acousticque destinée a mesurer les vibrations de l’air qui constituent le son,” in: *Annales de chimie et de physique*, Paris, 1819 p. 167; “New Acoustical Machine: The Siren,” in: *The Quarterly Journal of Science, Literature and Arts*, Vol IX, London, 1820, p. 175-178; Dotzler Bernhard, Schmidgen Henning and Weber Cornelia (eds.) *Parasiten und Sirenen: Zwei Zwischenräume*, Berlin: Transcript Verlag, 2004.

ment of rapid industrialisation, the idea of using acoustic devices was an utmost priority. One of the preliminary uses for the newly-developed siren was for producing *Zeitsignale* (time signals) to control working hours.⁶

The fact that the unpleasant sound of the siren was loud enough to be heard in all weather conditions made it also perfectly suitable for warning devices. One of its earliest uses was as a maritime warning: The “fog whistles” or “fog sirens”, as they were sometimes called, were located either at the entries of ports, or at dangerous locations such as cliffs and shallow waters, with the purpose of warning ships. However, due to the dependency of sound on weather conditions, fog sirens were sometimes counter-effective because they could warn ships many miles away but not nearby. But despite this fact, the sound they produced onshore was so intense that those who lived nearby suffered nervous breakdowns. In some cases, it was even reported that rocks were falling from the cliffs due to vibrations caused by the fog sirens. Furthermore, it was reported that chickens had died because of the vibrations caused by the fog sirens.⁷

Sirens of War

The piercing sound of the sirens placed upon tall and valuable infrastructures made it only a question of time until it was adapted to warning devices in times of war. This fact went hand in hand with the evolution of aerial warfare.

One major goal, which also turned out to be crucial for the future use of air-raid sirens as agents of active commemoration, was the technical ability to synchronize a nationwide air-raid siren system so that it would work simultaneously. Since the early days of World War I, all the belligerent countries invested a great deal of effort in building a nationwide network of air-raid warning systems; and yet it was not until 1917 that a central air-raid siren system became an official part of the home defence. Paradoxically, the most advanced warning system of the time was developed in countries whose hinterland was not under immediate threat. In the United States, for instance, firms such as Chrysler developed highly-mechanized sirens for public use. These cutting-edge sirens fulfilled varied and multiple functions, from ship horns, fog sirens, and factory sirens up to sirens for police cars and ambulances.⁸

The attempt of totalitarian regimes to create a community of fear in times of political turmoil gave air-raid sirens a new political role, as e.g. in Nazi Germany which could exploit the traumatic memories of World War I. For this purpose, the Nazi regime made the chilling sound of the air-raid siren a synonym for any future wartime horror that might await Germany, seeding a collective fear of *Einkreisung* (encirclement) within German society.

⁶ *Der große Brockhaus* 7. Bd., (Leipzig, 1934), 440.

⁷ Lamm Michael, *Feel the Noise: The Art and Science of Making Sound Alarming*, in: *Invention and Technology*, winter 2003, p. 24.

⁸ Lamm, 2003, p. 25.

The daily newspapers of the time were full of horror stories about what Germany ought to expect in the event of a future war.⁹ The outbreak of the war in Europe in September 1939 released many of the fears of the interwar period. Within this context, the chilling effect of the sound of air-raid sirens symbolized the daily suffering of millions throughout wartime Europe.

To continue with the example of Nazi Germany, the making of civilians into legitimate targets in times of war was cynically used by the Nazi regime to seed fear among the civil population of wartime Germany; and in this connection, the sound of air-raid sirens helped the regime draw a direct link between pre-war civil defence preparations, the actual circumstances of wartime and the traumatic memories of World War I. This allowed them to mobilize the civil population for their cause. In focusing on sirens and similar warning system instead of actively protecting their citizens, the Nazi authorities used the air raid sirens in order to obscure the fact that they were unable to stop the advancing front and the upcoming defeat of the late wartime years. The growing public pressure to do something about the Allied bombardment drove the Nazi authorities to intensify this awkward policy and establish a new Air Raid Protection Bureau, which was also responsible for operating the air-raid siren system. It was a semi-military office which stood under the auspices of the German Air Force (*Luftwaffe*), and its official aim was to “take the organization and technical precautions necessary to maintain the fighting ability, the working ability, and the will to resist of the entire people against the effects of attacks from the air”.¹⁰ In a tragic irony, the false connection between the directive nature of air-raid sirens as symbols of acute danger, and the inability of the Nazi regime to protect the citizens of the Reich, intensified the image of the air raid as a symbol for the collapse of Germany during the late phases of the war. For the civil population who constantly faced the daily horror falling upon them from the sky, the horrible sound of the air-raid siren turned into a sonic marker (*Lautsignal*) that indicated the hopelessness of their situation under a regime which had lost any contact with reality. In the city of Cologne, which was one of the most heavily-bombed German cities during the war, the daily repeating sound of the siren was even celebrated by the inhabitants of the air-raid shelters as a kind of a time signal (*Zeitsignal*) allowed them to “cross off” the days to the end of the war.¹¹

The end of the war did not end the use of air-raid sirens; on the contrary, after 1945 the sound of the siren became associated with the Cold War and the nuclear threat. Since the Cold War, one might suggest at least retrospectively, was not meant to deteriorate into a real war, the sound of the air

⁹ Ebner Alfred, *Schütze dich vor Luftgefahr*, (Berlin, 1935) 24 ff.

¹⁰ Luftwaffe Manuall L.Dv 751 ‘Principles for the management of air-raid protection,’ cited in: Boog Horst, *The Strategic Air War in Europe and Air Defense of the Reich, 1945-1944*, in: Horst Boog, Gerhard Krebs and Detlef Vogel (ed.) *Germany and the Second World War* Vol VII, Oxford: Clarendon Press, 2006, p. 235.

¹¹ Pettenberg Heinz, *Starke Verbände im Anflug auf Köln: Eine Kriegschronik in Tagebuchnotizen 1939-1945*, Köln 1995, p. 30

siren nevertheless remained a fearful reminder of threat on both sides of the Iron Curtain. In the absence of an impending air war, sirens—like church bells had done for centuries—returned to their traditional secular role as sonic markers for announcing public ingathering in times of collective danger. The post-1945 context was also the era when air-raid siren technologies made their way, mostly from the Federal Republic of Germany, to Israel as part of the newly-established commercial relations between the two countries. Nowadays, sirens are still widely-used in Europe (as elsewhere in the world) as sonic markers of danger. One of the most recent examples is the coordinated emergency alert system for Europe erected by the European Council under the title “Alert for All” (A4A).¹²

Jewish Past within Israeli Present

A closer look at the use of sirens for the purpose of public commemoration may show that it contains all the elements for creating what the anthropologist Victor Turner brilliantly called a social drama.¹³ In other words, the chilling sound of the siren, and its political-memorial uses, give us a momentous insight into the very relationships between the cognitive, affective and conative components of political commemoration in general, and the sonic elements of Holocaust commemoration in particular. Before we analyse these aspects at close range, we however need to take note of some of the difficulties which reframe the boundaries of our observation of the interplay between sound, the political uses of air-raid sirens, and the public commemoration of the Holocaust in Israel.

As Saul Friedländer has shown in his path-breaking study on National Socialism and the ‘Final Solution,’ the representation of the Holocaust creates an epistemological challenge which is rooted in the nature of the event.¹⁴ The global attempt of National Socialism to exterminate all Jews regardless of their class, language, nationality, gender, age, history or place of origin, undermines our ability to draw parallels between the Holocaust and other large-scale genocidal atrocities of the modern age.¹⁵ Moreover, the fact, that the Nazi extermination machinery—at least in its intended purpose, and in the way this was executed on the ground—was not limited to any actual political boundaries gave the infamous idea of the ‘Final Solution’ a global dimension from its very beginning. It was executed regardless of the actual course of the war, and sometimes even despite the German war effort. Against this background, the utopian racial worldview of Nazism was incorporated into the wartime constellation. At the same time, it was fuelled fur-

¹² See: <http://www.Alert4all.eu/>

¹³ Turner, Victor, *The Anthropology of Performance*, New York: PAJ Publishing, 1988, p. 90

¹⁴ Friedländer Saul (ed.) *Probing the Limits of Representation: Nazism and the Final Solution*, Cambridge Mass.: Harvard University Press, 1992

¹⁵ See for instance: Diner Dan (Hg.) *Ist der Nationalsozialismus Geschichte? Zu Historisierung und Historikerstreit*, Frankfurt a/M: Fischer Verlag, 1987

ther by the local interests of individuals and communities in the Nazi-occupied territories. This negative symbiosis between the local and the global during the war created a new form of genocidal attempt which in many ways existed “outside of history” but at the same time was fully incorporated within the hostilities of wartime and the course of their escalation.¹⁶

The epistemological breakdown that comes of the historical study of the Holocaust also creates significant obstacles for reconstructing its memory in the form of historical continuity. Moreover, its global dimension keeps resisting any attempt to subordinate the memory of the victims to any specific national narrative. In other words, the fact that the Nazi extermination of the Jews was carried out within a global and transnational framework also made it impossible to appropriate the memory of those who perished in the Holocaust for a specific national narrative, including the one that Israel has tried to build since its early days. So, the transnational nature of the Holocaust resists any nationalization in the present; instead, it calls on us to build up a transnational memory that emphasizes the crisis of Western civilization as such.¹⁷

The aphoristic tension between the national and transnational messages of the memory of the Holocaust can be observed, for instance, in the competing concepts of remembrance expressed by the *Yad Vashem* Memorial in Jerusalem and the United States Holocaust Memorial Museum in Washington D.C.: Whereas the former was erected in order to promote a national canon running from the Holocaust to Israeli national redemption, the latter tries to promote the universal message of the Holocaust in terms of the biblical commandment of “Do not murder”. Another recent example is the tension between the ceremonies of the national Israeli Holocaust and Heroism Remembrance Day, and the international Holocaust Remembrance Day.¹⁸

The split between the universal and national messages of the Holocaust challenged the newly-born Israel from its very beginning. Within this context, one could find unique attempts to draw lines of continuity between the pre-state history of Jews in the Diaspora and the story of Jews in the State of Israel. Sounds, and mostly sacred sounds, seemed to play a significant role in bridging the gap between the national and the universal messages of the Holocaust; this process rested in the simple fact that although sound is universal by its very nature, it is also easy to manipulate within the context of a specific time and place. Therefore sound—and above all state-induced

¹⁶ Diner, Dan, “Varieties of Narration: The Holocaust in Historical Memory,” in: *Beyond the Conceivable, Studies on Germany, Nazism and the Holocaust*, Berkeley, University of California Press, 2000. pp. 173-186.

¹⁷ For one of the most daring examples of such a point of departure, see: Natan Sznajder and Daniel Levy, *Holocaust and Memory in a Global Age*, Philadelphia: Temple University Press, 2006, see mostly Ch. 7.

¹⁸ Hanna Arendt was among the very first to identify the polemic conflict between the national and the universal message of the Holocaust in the state of Israel, see: Arendt, Hanna, *Eichmann in Jerusalem: A Report on the Banality of Evil*, New York: Viking Press, 1963, Ch. 7

sounds—became suitable agents for expressing the memory of the Holocaust as a national memory. But despite its initial potential, the use of sound for political ends faced significant difficulties from the very beginning, given the Jewish *Halacha* (Jewish law) and its religious use of sound as an element of the sacred. The traditional sonic agent of commemoration in Judaism is the *Shofar* (Ram's horn). According to the Bible and the *Halacha*, the sound of the *Shofar* was intended to open the gates of heaven when the children of Israel gathered at Mount Sinai to receive the Torah (Exodus 19:16). Its significance was also given psychoanalytical substance in Theodore Reik's seminal study of Jewish rituals. According to Reik, the sound of the *Shofar* is seen as the incarnation of the sound of God, and it has therefore been received with feelings both of fear and magnificence (Reik, 1919, Chp.4).

The observation that the sublime¹⁹ is a key element in the sound of the *Shofar* in Judaism leads us to ask to what extent the Israeli ritual of using air-raid sirens for the purpose of public commemoration continued, or even sought to displace, the sacred role of religious sounds like the *Shofar*. In fact, much of the answer will emerge from considering the performative role of air-raid sirens on Holocaust Remembrance Day. Following the paradigmatic pattern of the *Shofar* we can do this mostly by connecting public sounds with the sequence of events during sacred political times; such a connection is achieved mainly by the periodic nature of the ritual, which repeats itself every year on a fixed date. These repeating and periodic acts of commemoration reactivate a repertoire of symbols that interweave past memories with present experiences. In fact, such forms of political *habitus* (Elias, 1939) are also deeply rooted in the long-standing traditions of Judaism: The Jewish *Halacha* gives significant weight to the linkage between time, memory and meaning. This it does mainly by placing important events along the endless continuum of periodic time across the year. In modern Judaism, we can find four significant dates related to remembrance in general, and the remembrance of historical catastrophes in particular. These dates are marked by the practice of fasting, which is traced back to a long-standing tradition pioneered by the Hebrew prophet Zechariah in the 6th century BC.²⁰ Later, the practice was institutionalized in what became known as the *Taanit Tzibur* (public fast), a collective fast and prayer organized by a given community for the commemoration of its own victims. At the same time, the *Shofar* has continued to play a religious role, as well as a significant acoustic one similar to the sacred noise (*Heiliger Lärm*) in Christianity, or the call of the *muezzin* in Islam. It coordinates sound and action by allocating significant events to the

¹⁹ On the broad spectrum of the aesthetic category of the sublime and the beautiful, see: Burke, Edmund. *On the Sublime and Beautiful*. Vol. XXIV, Part 2. The Harvard Classics. New York: P.F. Collier & Son, 1909–14; (1756), Bartleby.com, 2001. www.bartleby.com/24/2. For a specific interpretation of these categories within the material representation of Raoul Wallenberg in contemporary monuments, see: Schult Tanja, *A Hero's Many Faces: Raoul Wallenberg in Contemporary Monuments*, Basingstoke: Palgrave Macmillan 2009 (2012). 224-226.

²⁰ See Zechariah 8:19.

linear course of time, and reactivating them in memory through the use of accepted sound signals. In other words, a collective sonic language is turned into a form of collective action which in our instance aimed to trigger a national and collective memory.²¹ Given this sonic approach to memory, it is therefore not surprising that the sacred practice of using the *Shofar* as a sonic marker of collective memory was then incorporated into what became known in Judaism as *zikbron teruah*, or the Jewish trumpet festival commonly known as *Rosh Hashana*.²²

The Mechanical Sound of Remembrance

In contrast to the long-standing tradition of using sound as an agent of active commemoration in Judaism, there is no direct evidence of when the practice of using air-raid sirens for public commemoration first began in the state of Israel. Despite the extensive research on Holocaust Remembrance Day in Israel, the origins of the ritual have remained vague and obscure. Some scholars have related it to the legacy of the Mandatory authorities of British-ruled Palestine (Handelman, 1998). An Israeli journalist went one step further, and speculated that the habit of using sirens in public ceremonies is rooted in a similar practice that first appeared in South Africa after World War I.²³

But paradoxically, the mysterious operation of the sirens also has a factual background, which rests in the simple fact that much of the information about the operation of air-raid sirens in the country remains beyond the reach of the public due to considerations of state security. In practice, it colours further the political ritual of using sirens for the purpose of national commemoration and wraps it in a nimbus of secrecy. The military-like secrecy around the civil operation of air-raid sirens for the purpose of public commemoration has not only contributed to the implicit linkage between the Holocaust and the military strength of contemporary Israel but has also found a silent echo in the legislation on this practice, the Holocaust Remembrance Day law of 1959, for instance, clearly refers to a two minutes' silence, though without mentioning any use of air-raid sirens for this purpose.²⁴

Despite their obscured origins, air-raid sirens have almost branded the collective sonic memory of the Jewish population of Israel in times of war as well as in times of peace. From the very beginning they became a widely accepted government action, so much so that both public and private at-

²¹ For the complex interplay between the performative and the act see: Austin J. L. *How to Do Things with Words*, Oxford: Clarendon Press, 1961 mostly Lecture XI.

²² On the Role of the *taanit tzibur*, see: Young James E. "When a Day Remembers: A Performative History of Yom Ha-Shoah" in: *History and Memory*, Vol. 2 Nr. 2 Winter 1990, p. 54-75 (here 55).

²³ Gilad Elon, "Why Israelis Observe a Moment of Silence to the Sound of Sirens on Holocaust Remembrance Day," *Haaratz Daily Newspaper*, April 12, 2015.

²⁴ Hok Yom HaZikaron LaShoah VeLagvura [*The Law of Holocaust and Heroism Remembrance Day*], 1959.

tempts to challenge the government's sonic monopoly on a religious or civic basis have been systematically repudiated by the vast majority of the Israeli-Jewish population. For many people, the siren and its ceremonial meaning are still regarded as a moment of nationwide solidarity (Ephratt, 2015); and the attempts of individuals to challenge this monopoly have been systematically rejected by the country's judicial and municipal establishments.²⁵

The fact that there is no fixed date for the birth of this ritual has further affected the way it has been incorporated within the sacred nature of the socio-political memory of the Holocaust in Israel. In fact, the paradox between a well-established ritual and its obscure origins further anchors the political role of air-raid sirens as sonic markers of collective memory. Yet despite its obscure origins, we can still find some clues. One of the earliest evidences for the use of air-raid sirens for such a subtle purpose dates back to 1949: During the first ceremony in memory of the fallen soldiers of Israel's War of Independence, which took place in the city of Haifa in northern Israel, there were several opportunities for using old sirens from the times of the British Mandate to announce the beginning of the commemorative event.²⁶ So the intended secularization of a political ritual in the newly-born country after its war of independence was well-suited to an increasing tendency to use similar local practices of remembrance. Against this background, it is perhaps not surprising that the transition from local ceremonies to an organized form of remembrance during the early 1950s seemed to galvanize some already-existing local practices, including the use of air-raid sirens for the purpose of Holocaust commemoration. On Holocaust Memorial Day in 1953, this already-existing practice was moved one step further: it was decided to signal the beginning of the day with a siren at 7am, and another siren blare announced the closing ceremony at 7pm. The organized deployment of air-raid sirens in ceremonies also evolved as a result of their role as a "silence enforcer": the ear-splitting sound, with its unpleasant effects, became a violent reminder of the fearful past as well as of a fearful present. Upon hearing it, the whole nation froze for a short time in a symbolic *rigor mortis* that moulded past and present.²⁷

The same goes for the sirens used in today's Holocaust commemoration rituals. But it demands explanation, e.g. to children who needs to be prepared in advance to handle the emotional reactions the sirens cause in them;²⁸ but not only children are required to develop specific emotional skills

²⁵ Israeli Supreme Court File 2156/13, Elhanan Esterovitz against the State of Israel from 14.04.2013.

https://supremedecisions.court.gov.il/Home/Download?path=HebrewVerdicts\13\560\021\03&fileName=13021560_103.txt&type=2 (retrieved, 16.07.2018)

²⁶ Azaryau Maoz, Pulhanei Medina: Hagigot HaAtzmaut VeHanzahat HaNoflim, 1948-1956, [*State Rituals, Independence Celebrations and the Commemoration of the Fallen*] Beer Sheva: Ben Gurion University Press, 1992, p. 154.

²⁷ I owe this wonderful idea to Dr. Tanja Schult

²⁸ State of Israel, Ministry of Education, Bishvilei Zikkaron: Tochnit Hinuchit Be-Nosseh HaShoah (*On the Paths of Memory: An Educational Program on the Holocaust*), at

in order to handle the demanding nature of the ritual. Instructions in simplified language, aimed at populations with disabilities and special needs, are regularly published by the Israeli Institute of Cognitive Accessibility. In their brochure, one reads the following information: “On Holocaust Memorial Day, we hear at 10am a siren throughout the country. A siren is a loud and continuous sound which means mourning and grief. When we hear the siren on Holocaust Remembrance Day,” the instructions continue, “we stop all of our activities. Those of us who are able should stand still and be quiet. The siren symbolizes the memory of the six million Jews who died in the Holocaust. During the siren, people are thinking about the Holocaust”.²⁹

Such a powerful gesture takes an emotional toll as well. Although a well-established ritual, not all are familiar with it. Even today we can read every year in the newspaper about hair-raising cases of individuals who misunderstood the violent language of the siren, and instead of standing still for two minutes ran in panic to the nearest air-raid shelter.³⁰

One Siren, one Memory?

Despite the lack of any explicit birthdate for this ritual there is no doubt that the practice of using air-raid sirens for the purpose of political commemoration powerfully combined memory, and cognitive and emotional experience, into a single political message or a joint experience.³¹ Furthermore, by using military instruments to achieve this purpose it also marked the monopoly of the national sound over the private Israeli public sphere.

In his path-breaking study on the “tuning of the world,” the Canadian composer and acoustic ecologist Murray Schaffer pointed implicitly at the very heart of our topic by showing that sound should be explained as a point on the spectrum between noise and silence.³² In the described context, we might also ask what it means that a loud and unpleasant sound is used to enforce upon the general population a two-minute silence for the commemoration of the Holocaust. In fact, this question was never seriously addressed by any of those who formalized the use of air-raid sirens for the purpose of active commemoration in Israel. Even the official statement of the Israeli Parliament regarding the use of air-raid sirens on *Yom HaShoah* speaks about

<http://cms.education.gov.il/EducationCMS/Units/Moe/Shoa/ganeyel/dim/ganim.htm> (retrieved 30.09.2016)

²⁹ See: Zfirat Zikkaron, in: *HaMachon HaIsraeli LeHangasha Kogenetivit, Mismah BePibhut LeShoni* [*The Israeli Institute of Cognitive Accessibility: Mismah in a Simplified Language*, Ami Association and Ono Academic College]

³⁰ “Shamah Et Zfirat Yom HaShoah VeRatzah LeMamad” (*Heard the siren of Holocaust Remembrance Day and immediately ran for the air-raid shelter*) in: *News 1*, 18.04.2007.

³¹ Turner, 1988, p. 91

³² Schafer Murray, *The Soundscape: Our Sonic Environment and the Tuning of the World*, Rochester, Vermont: Destiny Books, 1994, Ch. 3.

z'firat dumiyah, “a siren of silence”, without acknowledging the paradox of disrupting the silence with the piercing sound of an air-raid siren.³³

The manifold relations between noise, silence and political memory in Israel therefore call on us to embrace two basic assumptions concerning the political role of air-raid sirens and their use as agents of commemoration. First is the fact that as part of the country's civil defense system, air-raid sirens can only be operated by state military personnel, or by others on their behalf;³⁴ this means that any operation of air-raid sirens beyond their original purpose not only shifts their meaning but can also be regarded as an organized form of state activity. This brings us to the second point, namely that given their nature and function, air-raid sirens dominate the state monopoly over the legitimacy of using sounds in general. Therefore, when air-raid sirens are used for the purpose of public commemoration, their blaring sound not only disseminates the horrifying message of collective danger but also relegates their original function to the realm of collective political memory.³⁵

Against this background, the goal-oriented message of the air-raid siren, and its sonic attempt to tune the ears of the nation to a specific socio-political message, vocalizes the implicit idea that one sound equals one memory, and one memory means one past. This is accomplished by using a very loud and fearful sound without regard to the sentiments of either non-Israeli Jews or non-Jewish Israelis. This form of state-orchestrated cultural uniformity also challenges any collective memories which do not stay in line with the grand, national narrative of the country. So, the same blare of an air-raid siren which unites the general civil population in times of collective danger also creates within its political sphere an acoustic distinction between competing memories and socio-political narratives. The notion that different sonic messages are being addressed to different audiences merely by manipulating the context of the sound can be observed by gauging the dissimilar reactions of various populations in Israel to the same siren. For many among the non-Orthodox part of the Israeli-Jewish population, the sound of the siren on Holocaust Remembrance Day turns from an external into an internal form of silence and commemoration. Many Orthodox Jews however, consider the ritual of standing still to the sound of the siren as a modern form of idola-

³³ Yom HaShoah VeHagvurah (*The Day of Holocaust and Heroism*) on the Knesset Website: <http://main.knesset.gov.il/occasion/pages/ShoahIntro.aspx> (Last retrieved, 29.6.16) compare, Knesset Protocol from 28.03.1963 in *Divrei HaKnesset*, 36 (1963), 1718.

³⁴ On the Z'firat HaShabat see: Yaron Jean, “Derech Roeshet Litzor Dumiyah, Al Mekoma Shel HaSirena BeHayenu” (*A noisy way to commemorate the past*), *Haaretz*, 9.05.2011 (Heb.)

³⁵ According to Israeli military officials, the State of Israel is covered with a dense network of air-raid sirens. There are about 3000 sirens, one for every 750 square meters. See: Interview with Colonel Gil Hoffman: The Retiring Officer, the head of the warning department at the Pikud Haoref, in: Golan, Taka BaShofar, *Modiin News*, 19.01.2015

try.³⁶ It therefore implicitly creates a form of counter-ritual.³⁷ An indirect corroboration of this can be found in the recurring visits paid by mostly secular journalists to the ultra-Orthodox neighbourhoods of the cities of Jerusalem and Bnei-Brak on the eve of Holocaust Remembrance Day, with the purpose of sneaking photos of the ultra-Orthodox Jews who keep walking instead of standing still during the two-minute siren. The situation has become so tense that in order to avoid further unnecessary clashes between the Orthodox and non-Orthodox Jews over this issue, many rabbis in the ultra-Orthodox communities have called on their disciples to respect the secular rituals of the country while in public and to stand still during the two-minute silence.³⁸

Among the Muslim population of the country the situation is far more complex since the political and commemorative use of the sound of the siren not only evokes a religious challenge but can be seen as yet another indication of civil inequality. This is rooted in the challenge of identifying oneself with a national narrative that draws a direct link between the Holocaust, the establishment of the state of Israel and the Arab-Israeli conflict. In other words, for the non-Jewish population of the country hearing the sound of the siren on Holocaust Remembrance Day expresses a the hegemonic paradigm that reveals their civil otherness or as it was simply put, of being the “victims of the victims”.³⁹ One of the recent instances which illustrates the painful interplay between public sounds and the creation of social boundaries in Israeli society is the mounting public dispute over the religious sound of the *muezzins* throughout the country. As long as the sound of the *muezzins* was nothing more than a religious ceremony of the local Arab Muslim communities, it was relatively tolerated by the non-Muslim population of Israel. However, as soon as the sound of the *muezzins* turned into a political statement that was experienced as a counter-ritual which violated the widely-accepted consensus over public sound in the nation, this immediately drew sharp fire from many among the Israeli Jewish population. For many among the non-Muslim population, it was experienced as a sonic violation of the status quo. As a result, several ultra-nationalist Israeli Jewish politicians took the issue one step further and called for limiting the sound of the *muezzin* on the grounds that it violated municipal rules of noise abatement. Need-

³⁶ „Yom HaShoah Serves an Important Purpose,” in: *Hamodia*, 29.04.2014

³⁷ On the multiple role of rituals, see the classic study of Victor Turner, *Das Ritual: Struktur und Anti-Struktur*, Frankfurt a/M, Campus Verlag, 2000

³⁸ Cohen Israel, Al Mi SheShoheh Beet Hatzfira Barhov, Laamod Dom [*Those who are caught in public during the two-minutes' silence should stand still*], in: *Hamodia*, 4.05.2014.

³⁹ Lapid Yair, Ma Hoshev Tibi al Yom HaShoah, [What Tibi thinks about the Holocaust Remembrance Day], *Mako News* 29.01.2010 in: www.mako.co.il/news-channel2/Friday-Newscast/Article-701426ca42b7621004.htm

less to say, such a provocative measure drew much fire from many others in Israel as well as abroad.⁴⁰

In recent years however, there have been other critical voices as well, whose singularity rests in the fact that they are no longer caught up in the conflict between traditional religious and secular paradigms. One of the most interesting voices is a short story of the Israeli author Etgar Keret called simply *Hatzfira* (The Siren). The story describes the experience of a teenager named Eli at school during the time between the Holocaust Remembrance Day and *the Yom HaZikharon* for fallen soldiers. Eli witnesses his schoolmates stealing the bicycle of the custodian who is a survivor of the Holocaust, and he decides to give their names to the headmaster. After he is discovered by his schoolmates, they wait for him on his way home with the intention of bullying him. However, just as they are about to beat him up, the Remembrance Day siren is sounded and Eli can freely go home while they are kept standing until the two minutes are over.⁴¹ This absurd situation, in which the collective standstill of the strong during the siren enables the weak to escape, elaborates the double meaning of past memories in the face of the contemporary symbol of the “Tzabar” (prickly pear) metaphor.⁴²

Conclusions

In his ground-breaking study of the soundscape of the French countryside of the nineteenth century, the French historian Alain Corbin observed to what extent church bells and their unique sound created a communal sense of belonging, both in times of fear and times of joy (Corbin 1998, predominately chapter 3). The binding effect of the church bell applies also to the sonic role of the *Shofar* as well as the call of the *muezzin*. All these public sounds have served throughout history as sonic manifestations of the sacred, and thus drawn an invisible line of demarcation between the community and the other. The sacralisation of sound as a social binding force also applies to the political role of air-raid sirens and their use as sonic agents of commemoration. The blare of the air-raid siren, which in normal times is strongly related

⁴⁰ Just to mention a few instances: Lis Jonathan, "Israeli Ministers Approve Bill Banning Mosque Loudspeakers", *Haaretz* 13.11.2016; Diab Khaled, "Is an Israeli Bill to Mute the Muezzin a Threat to Palestinian Identity?" in: *Haaretz*, 23.11.2016; Harkov Lahav, "Jewish, Muslim MKs Call to Pull the 'Muezzin Bill' in: *Jerusalem Post*, 6.12.2016.

⁴¹ Etgar Keret, *Zinorot, (Pipelines)*, Tel Aviv: Modan, 2002.

⁴² In Hebrew, *tzabar* or Sabra is a slang nickname for native-born Jews in British-ruled Palestine and later in the territories of the State of Israel. During the time of the British mandate, the term *sabra* became a cultural icon to celebrate the “New Jew” who was born in Israel in contrast to the newly-arrived “Diaspora Jews”. The term took on a discriminatory role and suffers from many paradoxes, one of which is the fact that the word *sabra* in Hebrew originated from the Arabic word *sabr*. On the cultural transformation of the cultural code of the *sabra*, see: Almog Oz, *The Sabra: The Creation of the New Jew*, Berkeley: University of California Press, 2009.

to fear and danger, has become within the political soundscape of Israel an iconic sound that elaborates a powerful cognitive and emotional force, to borrow the well-known explanation of Victor Turner as to the performative nature of rituals.⁴³ In so doing, air-raid sirens in Israel not only serve as neutral warning devices, but have also turned into a stimulative force of silence and remembrance that is based upon a reverse action: upon hearing the air-raid siren on Holocaust Remembrance Day you are requested to freeze in your place for two minutes instead of running for shelter, as both instinct and convention would tell you. In so doing, the sound of the siren becomes a powerful binding force that amalgamates the traumatic Jewish past with the dangers faced by the state of Israel in the present. The yearly repetitive use of air-raid sirens for the purpose of public commemoration turns the unpleasant sound of the siren into a powerful force that intrudes not only on the ears of its audience, but also on their bodies and minds. The message is loud and clear: only those who commemorate the suffering of Jews in the Diaspora, and in its largest catastrophe, can safeguard the need of contemporary Jews to have a state of their own and thus have their present in Israel. However, such a one-dimensional political use of wartime sound for drawing a simplistic line of continuity between the past destruction of non-Israeli Jews and the present redemption of Jewish Israelis, takes its toll as well. The cultural historian Peter Burke warned us that a constant repetition of memory implicitly calls also for variations;⁴⁴ and a similar danger applies to the institutional efforts to establish a sonic equation of one sound equals one memory in Israel. For those who seek to build a uniform memory within the nation, the silencing effect of the siren seems to achieve the opposite, given the simple fact that its effect is so strong that it constantly demands a reverse action by those who refuse to line with the dominant political memory. This is done by suggesting alternatives to the meta-narrative within the Jewish as well as non-Jewish population of the country. Two given examples were the counter reactions of ultra-Orthodox Jews and Israeli-Arab toward the two-minute siren-stand-still. Far more important, by using such a powerful instrument as an air-raid siren for subordinating the universal message of the Holocaust to a single national narrative, one not only silencing the multiplicity of Jewish and Israeli histories but may also fail to notice the diversity of the Israeli society and its opportunities for the present.

⁴³ Turner Victor, *Das Ritual: Struktur und Anti-Struktur*

⁴⁴ Burke Peter "Commemorations. Performing the Past" in: Karin Tillmann, Frank van Free and Jay Winter (ed.) *Performing the Past: Memory, History and Identity in Modern Europe*, Amsterdam: Amsterdam University Press, 2010, pp. 105-119 (112).

References

- Almog, Oz. 2009. *The Sabra: The Creation of the New Jews*. Berkley: University of California Press.
- Austin, John L. 1961. *How to Do Things with Words*. Oxford: Clarendon Press, 1961.
- Azaryau, Maoz. 1992. *Pulbanei Medina: Hagigot HaAtzmaut VeHanzabat HaNoflim, 1948-1956*, [State Rituals, the Celebration of Independence and the Commemoration of the Fallen] Beer Sheba: Ben Gurion University Press.
- Boog, Horst. 2006. "The Strategic Air War in Europe and Air Defense of the Reich, 1943-1944", in: *Germany and the Second World War*, edited by Horst Boog, Gerhard Krebs and Detlef Vogel. Oxford: Clarendon Press, Vol. VII.
- Burke, Edmund. 1756 *On the Sublime and Beautiful*. Vol. XXIV, Part 2. The Harvard Classics. New York: P.F. Collier & Son, 1909-14
- Burke, Peter. 2010. "Co-memorations. Performing the Past" in: *Performing the Past: Memory, History and Identity in Modern Europe* edited by Karin Tillmann, Frank Van Free and Jay Winter. Amsterdam: Amsterdam University Press, pp. 105-119.
- Cohen, Israel. 2014. "Al Sheshoheh Beet Hatzfira Barehov, Laamod Dom [those who are caught in public during the two minutes silence should stand still], in: *Hamodia* (4 May 2014).
- Corbin, Allain. 1998. *Village Bells: The Culture of the Senses in the Nineteenth Century French Country Side*. New York: Columbia University Press.
- de La Tour, Cagniard, "Sur la Sirène, nouvelle machine d'acousticaue destinée a mesurer les vibrations de l'air qui constituent le son" *Annales de chimie et de physique*, Paris, 1819.
- Der große Brockhaus 7. Bd., Leipzig, 1934
- Diab Khaled, "Is an Israeli Bill to Mute the Muezzin a Threat to Palestinian Identity?" *Haaretz*, November 23, 2016
- Diner, Dan (ed.) *Ist der Nationalsozialismus Geschichte? Zu Historisierung und Historikerstreit*, Frankfurt a/M: Fischer Verlag, 1987.
- Diner, Dan, "Verities of Narration: The Holocaust in Historical Memory" in: *Beyond the Conceivable, Studies on Germany, Nazism and the Holocaust* edited by Dan Diner, Berkley: University of California Press, 2000. pp. 173-186.
- Dotzler Bernhard, Schmidgen Henning and Weber Cornelia (eds.) *Parasiten und Sirenen: Zwei Zwischenräume*, Berlin: Trascript Verlag, 2004.
- Elon, Gilad, "Why Israelis Observe a Moment of Silence to the Sound of Sirens on Holocaust Remembrance Day" *Haartz Daily Newspaper*, April 12, 2015.
- Ephratt, Michal, "The Minute of Silence as Solidarity and Individuation: A Conceptual Model of an Israeli Ritual" *Journal of Ritual Studies*, 29(1), pp. 1-20.
- Fried, Shelly, "The Yellow Background of the Israeli Military Medal of Valor: A Combination of Jewish History and Israeli Reality" *Zmanim: A Historical Quarterly*, 70, 2000, pp. 35-47.
- Friedländer, Saul, "The Shoah between Memory and History", *Jewish Studies* 1990, 30 pp. 11-20.
- Friedländer Saul (ed.) *Probing the Limits of Representation: Nazism and the Final Solution*, Cambridge Mass.: Harvard University Press, 1992.
- Feldman, Avi, "Still Vs. Tremble: The Power of Silence a Democratic Secular Public Act" in: http://zweiminutenstillstand.de/wp-content/uploads/2013/06/Avi_Feldman.pdf
- Golan, Taka BaShofar, *Modiin News*, January 1, 2015.

- Harkov Lahav, "Jewish, Muslim MKs Call to Pull the 'Muezzin Bill', *Jerusalem Post*, December 6, 2016.
- Handelman Don, *Models and Mirrors: Toward Anthropology of Public Event*, Oxford: Berghahn Books, 1998.
- "New Acoustical Machine: The Siren", *The Quarterly Journal of Science, Literature and Arts*, Vol IX, London, 1820, pp. 175-178.
- Hok Yom HaZikaron LaShoah VeLagvura [The Law of the Holocaust and Heroism Remembrance Day], 1959.
- Israeli Supreme Court File 2156/13 Elhanan Esterovitz against the State of Israel from April 14, 2013.
- Israel Defense Force Spokesman, Facebook from April 16, 2015.
- Jean, Yaron "Derech Roeshet Litzor Dumiyah, Al Mekoma Shel HaSirena BeHayenu" (A Noisy Way to Commemorate the Past), *Haaretz Daily Newspaper*, May 9, 2011.
- Keret, Etgar. *Zinorot*, (Pipelines), Tel Aviv: Modan, 2002(1992).
- Knesset Protocol from 28.03.1963 *Divrei HaKnesset*, 36 (1963), 1718.
- Lamm, Michael, "Feel the Noise: The Art and Science of Making Sound Alarming" *Invention and Technology*, winter 2003.
- Lapid Yair, Ma Hoshev Tibi al Yom HaShoah, [What Tibi thinks about the Holocaust Remembrance Day] *Mako News* 29.01.2010, www.mako.co.il/news-channel2/Friday-NewsCast/Article-701426ca42b7621004.htm
- Landsberg, Alison, *Prosthetic Memory: The Transformation of American Remembrance in the Age of Mass Culture*, New York, 2004
- Lis, Jonathan "Israeli Ministers Approve Bill Banning Mosque Loudspeakers", *Haaretz Daily Newspaper*, November 13, 2016
- "Meragsh: HaNitzola Hifiliah Et Zfirat Yom HaZikaron LaShoah" [Exciting: The Survivor Operated the Memorial Siren of the Holocaust Remembrance Day] in: *Maariv Daily Newspaper*, accessed April 16, 2015
- Seeberg, Luise M., Levin Irene, Lenz Claudia (ed.) *The Holocaust as Active Memory: The Past in the Present*, London: Routledge, 2013
- "Shamaa Et Zfirat Yom HaShoah VeRatzah LeMamad" (Heard the Siren of the Holocaust Remembrance Day and Immediately Ran for the Air Raid Shelter) in: *News 1*, April 18, 2007
- Moore, F. Sally and Myerhoff G. Barbara (eds.), *Secular Ritual*, Assen: Van Gorcum, 1977.
- Pettenberg, Heinz. *Starke Verbände im Anflug auf Köln: Eine Kriegschronik in Tagebuchnotizen 1959-1945*, Köln 1995
- Petraka, Vivian M. "Spectacular Suffering: Performing Presence, Absence, and Witness at the U.S. Holocaust Museum Memorial Museum" in: (ed.) *Performance Studies* edited by Erin Shreff, Palgrave: New York, 2003, pp-82-96.
- Reik, Theodore, *Rituals: Four Psychoanalytic Studies*, New York, 1946 (1919)
- Shapira, Anita, "The Holocaust: Private Memory and Public Memory", *Zmanim: A Historical Quarterly*, 57, 1996-97, 4-13.
- Schafer, Murray, *The Soundscape: Our Sonic Environment and the Tuning of the World*, Rochester, Vermont: Destiny Books, 1994
- Schult, Tanja, *A Hero's Many Faces: Raoul Wallenberg in Contemporary Monuments*, London: Palgrave Macmillan 2009 (2012)
- Sznaider, Natan and Daniel Levi, *Holocaust and Memory in a Global Age*, Philadelphia: Temple University Press, 2006.

- State of Israel, Ministry of Education, Bishvilei Zikkaron: Tochnit Hinuchit BeNosseh HaShoah (*On the Paths of Memory: An Educational Program on the Holocaust*), <http://cms.education.gov.il/EducationCMS/Units/Moe/Shoa/ganeyel/dim/ganim.htm> (retrieved 30.09.2016)
- Turner, Victor. *The Anthropology of Performance*, New York: PAJ Publishing 1988,
- Turner, Victor. *Das Ritual: Struktur und Anti-Struktur*, Frankfurt a/M: Campus Verlag, 2000
- “Yom HaShoah Serves an Important Purpose” *Hamodia*, April 29, 2014
- Yom HaShoah VeHagvurah (The Day of Holocaust and Heroism) in the Knesset Website: <http://main.knesset.gov.il/occasion/pages/ShoahIntro.aspx> (accessed June 29, 2016)
- Young, James E. 1990. “When a Day Remembers: A Performative History of Yom Ha-Shoah” *History and Memory*, Vol. 2 Nr. 2 Winter 1990, pp. 54-75.
- Zarfati Rahel, “Beiyn Shofar LeTzfira: Moadei Hatikkaron BeTezugah BeMuzeon Israel” (Between the Shofar and the Siren: Dates of Remembrance and its Representation in the Israel Museum) *Platforma*, July 2013
- Zerubavel Eviatar, 2006, *The Elephant in the Room: Silence and Denial in Everyday Life*, Oxford/New York: Oxford University Press
- Zfirat Zikkaron, in: HaMachon HaIsraeli LeHangasha Kogenetivit, Mismah BePishut LeShoni [The Israeli Institute of Cognitive Accessibility: Mismah in a Simplified Language, Ami Association and Ono Academic College]



This work is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike International 4.0 License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-sa/4.0/>; or, (b) send a letter to Creative Commons, 171 2nd Street, Suite 300, San Francisco, California, 94105, USA