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IN THE PLACE THE PLACE
亞洲產業文化資產青年實踐工作坊
2021-22
Youth Hands-on Workshop on Industrial Heritage

本期專題

In the Place: Messages from
the Industrial heritage fields

In the Place - 產業文化資產場域的啟示



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Editor's Preface 編者的話

— Chris Tzu-Hsien Yuan (Assistant Professor of the Graduate Institute of Animation and Film Art, Tainan National University of the Arts, Taiwan)

國立臺南藝術大學動畫藝術與影像美學研究所助理教授 袁子賢

The COVID-19 outbreak is driving the world to transition from “offline” to “online.” “The future is now” is the trending concept that underlines an era where increased emphasis will be placed on issues of preservation, interdisciplinary integration, and the application of industrial heritage. How to reflect on the past while revitalizing industrial heritage in a sustainable manner is one of the most important issues facing us today. The International Committee for the Conservation of the Industrial Heritage (TICCIH) will host the TICCIH 2022 Congress in Montreal, Canada, in August 2022. The conference will be held under the theme: “Industrial Heritage Reloaded,” which echoes the aforementioned trend. Today, we see that organizations and individuals from all over the world—from governments to civil societies—participate actively in the preservation of industrial heritage. In their respective fields of practice, they bring different energies, possibilities, and imaginations to various preservation and revitalization projects through art, technology, education, tourism, collections, exhibitions, creativity incubation centers, etc.

From the Nizhny Tagil Charter for Industrial Heritage (2003) to the Taipei Declaration for Industrial Heritage (2012), it is revealed that industrial heritage preservation is closely linked to the lives and memories of local people. How to present the industrial landscape, cultural context, and collective memories of a place is the theme of this issue, hence the title “In the Place.” The series event was organized by the Bureau of Cultural Heritage, MOC, Taiwan. Brought together representatives from three international industrial heritage units across Asia, America, and Europe, namely ANIH, TICCIH (The International Committee for the Conservation of the Industrial Heritage), and ERIH (European Route of Industrial Heritage). This article not only elaborates on the lectures given by the experts and scholars, but also introduces the methods and strategies of “design thinking” and “digital translation.”

在 Covid-19 疫情翻轉線上與線下的時代，「現在即未來」是產業文化資產的保存、跨域整合與應用的必然趨勢。如何反思過去、以永續性的未來思考現在的創生，則是當代產業文化資產發展的重要課題，也正呼應 2022 年 8 月將於加拿大蒙特婁舉辦的第 18 屆國際工業遺產保存委員會 (The International Committee for the Conservation of the Industrial Heritage, TICCIH)，以「工業遺產重載 (Industrial Heritage Reloaded)」的主題。今日，我們看見全球各地，從政府到民間團體、跨領域、跨世代的組織與個人都積極投入產業文化資產的保存運動，從各自實踐的場域中，以藝術、科技、教育、典藏、展示、觀光、創生基地…等方式，帶給產業文化資產的保存與活化，不同的活力、可能性與想像。

從 2003 年的《下塔吉爾憲章》到 2012 年的《亞洲工業遺產臺北宣言》都揭示產業文化資產的保存與地方人們的生活及記憶，緊密相連，如何展現「在此一方」的產業地景、文化脈絡與集體記憶，是本期專刊所關注的主題。本期專刊，集結「亞洲產業文化資產平臺」(ANIH)、「國際工業遺產保存委員會」(TICCIH)與「歐洲工業遺產路徑」(ERIH) 三個橫跨亞、美、歐三大洲的國際工業遺產單位代表與會，由臺灣文化部文化資產局主辦的「在此一方：工業遺產場域的啟示」青年論壇與工作坊，本文不僅詳細闡述專家學者的演講內容，更提出「設計思考」與「數位轉譯」的方法與策略。

第二篇文章由加拿大魁貝克大學教授，同時也是 TICCIH 2022 年大會主辦人 Lucie K. Morisset 博士以加拿大雅維達「工業村」(Company Towns) 為研究案例，討論工業革命興起的工人聚落，在「去工業化」(deindustrialization) 的挑戰下，大量失去原有的地景、歷史，甚至集體記憶。本篇文章提出，我們應該思考工業遺產的價值，致力於空間與文化記憶的保存與經驗分享，重新找回工業村的光榮感與歸屬感。

數位技術的應用不僅僅是產業文化資產保存的趨勢，更需要嚴謹的方法學。數位文化遺產歐洲研究區 Kyriakos Efsthathiou 主席，以賽普勒斯科技大學數位文化遺產歐洲研究區計畫為案例，從實務的操作面，提出數位文化遺產的操作流程、問題與挑戰、及解決之道。

The second article was contributed by Professor Lucie Morisset from the University of Quebec at Montreal (UQAM), Canada, which will be the host country of TICCIIH 2022. In the article, she discusses cases such as Arvida, a Canadian “company town” that emerged from the industrial revolution, and how similar workers’ settlements have lost their original landscapes, histories, and even collective memories under the challenge of “deindustrialization.” To rebuild a sense of pride and belonging among the company town inhabitants, she proposes that we should reflect on the value of industrial heritage, conserve the spatial and cultural memories contained therein, and share our experiences with one another.

A trend in industrial heritage conservation is the application of digital technologies, which requires rigorous, methodological support. The third article was contributed by Kyriakos Efstathiou, ERA Chair on Digital Cultural Heritage, Cyprus University of Technology. Using the digital cultural heritage project at the Cyprus University of Technology as an example, he illustrates the operational process, as well as the problems, challenges, and solutions of the digital project from a practical standpoint.

The fourth article was written by Mr. Chun-Ta Huang, Vice Secretary-General of the Institute for Historical Resources Management, and Mr. Deng-Teng Leon Shih, Assistant Professor of the Department of Interior Design, China University of Technology, on a practical case of heritage preservation and memory interpretation at the Jianguo Brewery. They introduce and exemplify how tangible cultural spaces and objects, as well as intangible cultural memories and stories, can be integrated with the researcher’s findings to achieve interdisciplinary and virtual-reality integration through digital technology and creative thinking. At the end of the article, the two authors mention that it is not enough to rely on private initiatives alone to achieve sustainable conservation of cultural heritage. Government support is also needed.

The last article in this Bulletin was written by Dr. Teoh Chee Keong from the School of Architecture and Built Environment, UCSI University, Malaysia. He clearly illustrates the relationship between tin mining and the different colonial powers in Malaysia from a historical

第四篇文章由台灣歷史資源經濟學會副秘書長黃俊達與中國科技大學室內設計系助理教授施登騰，共同撰述以「建國啤酒廠」為場域的文資保存與記憶轉譯的實務案例，提出如何導入數位科技將有形的文資空間、物件與無形的文化記憶與故事，結合研究者的調查成果與轉譯者的創意思維，示範跨域整合與虛實並行的方法。文末，兩位作者也提到文資的保存不能僅停留於民間的力量，更需要政府的支持，方能達到永續的發展。

第五篇專文則由馬來西亞 UCSI 大學建築系張集強助理教授，從歷史發展的角度，清楚的梳理馬來西亞錫礦開採與不同殖民國家之間的關係，讀者可以從這段歷史中，理解錫礦產業的發展，如何形塑馬來西亞的近代文化遺產與景觀。

國際動態的部分，正修科技大學建築與室內設計系講師陳柏志，爬梳臺灣在產業文化資產保存推動的歷程，並強調「整體性保存」的重要性；泰國的先皇技術學院建築、藝術與設計學院助理教授 Parinya Chukaew 分享馬卡森廠區鐵道文化資產保存與公民參與的案例；財團如何與地方居民在產業文化資產的保存發展共榮的關係，帝京大學學術情報部門職員廖怡鈞以日本「別子銅山」工業遺產群為例，進行精彩的討論；「記憶」與產業文化資產的實體保存，都面對即將消逝的危機，在國立雲林科技大學文化資產維護系助理教授王新衡博士的文章中，以「煤記憶—平溪鐵道百年煤礦文化」特展及系列活動為例，致力將礦工的日常生活、礦業史與礦業文化資產做系統性的整合。

「記憶」，亦為本期專刊書評的主軸，第一篇書評邀請到國立臺灣歷史博物館研究組曾婉琳析論，《打開電視：看見臺灣電視產業文化性資產》一書，本書由國立臺南藝術大學音像紀錄研究所曾吉賢助理教授主編。第二篇書評則由臺灣城鄉特色發展協會理事長許主冠，評論由文史青年與在地礦工共同書寫的《黑暗的世界—猴硐礦工回憶錄》一書。

法國史學家 Pierre Nora 提出記憶之於歷史的關係，並直言「記憶所繫之處既是物質的、象徵的，也是功能的，三種意義同時存在，只是程度各異。」¹ 記憶，賦予產業文化資產有機的生命與活力，在文資的空間裡，曾經留下人們的日常生活經驗與足跡，這些故事將會帶給我們共感與共鳴。希望本期諸位作者的文章，能讓讀者們看見在世界各地都有不同的夥伴「在此一方」的為文化資產保存而努力，也期盼這些文章能帶給更多夥伴新的火花。

¹ Pierre Nora 著，戴麗娟譯，《記憶所繫之處 I》（台北：行人，2012），p.27
Nora, P. (1984), “Entre mémoire et histoire”, Les Lieux de Mémoire, Vol. 1, pp. 23-43.

perspective. From the author's account of this history, readers gain knowledge about the development of the tin mining industry in Malaysia and how the industry shaped the country's industrial heritages and landscapes in contemporary times.

In the International Trends section, Mr. Bo-Zhi Chen, Lecturer of the Department of Architecture and Interior Design, Cheng-Shiu University, reviews Taiwan's history of promoting industrial heritage preservation and emphasizes the importance of taking a holistic preservation approach, while Mr. Parinya Chukaew, Assistant Professor at the School of Architecture, Art, and Design, King Mongkut's Institute of Technology Ladkrabang, shared about the preservation of railway heritage and public participation at the Makkasan factory district. This section also features a fascinating discussion by Ms. Yi Chun Liao, a staff member at the Teikyo University Academic Center. She cites the Besshi Copper Mines in Japan as an example to illustrate how a business conglomerate and local residents can develop mutually beneficial relationships in preserving industrial heritage. Today, both the physical buildings and the accompanying "memories" of industrial heritage are facing the crisis of imminent disappearance. To illustrate the ongoing preservation efforts in Taiwan, Dr. Sin-Heng Wang, Assistant Professor of the Department of Cultural Heritage Conservation, National Yunlin University of Science and Technology, introduces an exhibition entitled "Coal Memory: Special Exhibition on the Centennial of the Pingxi Line and Coal Mine Culture" and its related promotional activities, which systematically documented the daily life of the miners, the mining history, and mining heritage.

"Memory" is also the central focus of this Bulletin's book reviews. The first book review was contributed by Ms. Wan-Lin Tseng, Research Assistant at the

National Museum of Taiwan History, who discusses the book *Turn on the TV - Seeing the Cultural Heritage of Taiwan's Television Industry*, edited by Mr. Chi-Hsien Tseng, Assistant Professor at the Graduate Institute of Documentary & Film Archiving, Tainan National University of the Arts. The second book review was written by Chu-Kuan Hsu, President of Taiwan Community Empowering Network. The review comments on the book *Way Back to Memoirs of Houtong Coal Miners*, written jointly by young people engaged in culture and history and a group of local miners.

The French historian Pierre Nora has proposed the relationship between memory and history, stating that: "Memory place is definable in the three senses of the word—material, symbolical and functional; all in different degrees but always present." Memory is what gives organic life and vitality to industrial heritage. Within cultural heritage spaces, remnants of people's everyday experiences and footprints of the past are preserved. Their stories will cultivate empathy and resonance in all of us. It is hoped that after reading the many articles by different authors in this Bulletin, readers can see that ANIH is actively working with different partners around the world, who are contributing to cultural heritage preservation in their respective places. It is also hoped that these articles can bring new sparks of interest and ideas to ANIH's partners worldwide.

Asian Network of Industrial Heritage (ANIH) 2021 International Youth Forum Activity Series: Inspiration and Interdisciplinary Communication

2021 年亞洲產業文化資產平臺國際青年論壇系列活動報導：工業遺產場域的啟示與跨界

Chao-Shiang Li (Adjunct Assistant Professor of Department of Interior Design, China University of Technology, Taiwan)

中國科技大學室內設計系兼任助理教授 李兆翔

This series activities organized by the Bureau of Cultural Heritage, MOC, Taiwan. Under the theme of “In the Place: Messages from the industrial heritage fields,” this year’s “International Youth Forum Activity Series” aimed to equip young professionals with the five capacities of analysis, understanding, innovation, integration, and sustainability, while exploring the possible educational implications of the current state of industrial heritage sites. The activity series kicked off with the “International Forum of Industrial Heritage: Glocalization,” which brought together representatives from three international industrial heritage units across Asia, America, and Europe, namely ANIH, TICCIH (The International Committee for the Conservation of the Industrial Heritage), and ERIH (European Route of Industrial Heritage). Following the forum was the “Industrial Heritage Conference: Interdisciplinary Value-Added,” which gathered frontline industrial and cultural heritage practitioners from home and abroad to engage in practical exchanges on recent international issues of interdisciplinary integration and natural and cultural heritage conservation. Following the two events was the five-day “Youth Hands-on Workshop on Industrial Heritage.”

“International Forum of Industrial Heritage: Glocalization” on October 1st: From the Place to the World—Heritage as a Driving Force of Change

Under the theme of “Glocalization,” this international forum examined the “reloading” of industrial heritage in an era of ever-changing and advancing cultural landscapes, while reflecting on its emerging or potential value and significance. The first keynote speech was given by Professor Lucie Morisset from University of Quebec at Montreal (UQAM), Canada, the host country

本系列活動以「In the Place 在此一方：工業遺產場域的啟示」為主題，提出「分析力、理解力、創新力、整合力、永續力」等五項青年培力，探討產業文化資產場域現況所展現的教育意義；系列活動以「國際論壇—全球在地化」開場，集結 ANIH(亞洲產業文化資產平臺)、TICCIH(國際工業遺產保護委員會)與 ERIH(歐洲工業遺產路徑)三個橫跨亞、美、歐三大洲的國際工業遺產單位代表與會；再由「交流會議—跨域加值」接力，邀集國內外第一線產業文化資產工作者，針對近年國際間自然與文化資產跨域整合保存議題進行實務交流；經過兩場前導活動的熱身，接續展開為期五天的「青年實踐工作坊」。

10月1日「國際論壇—全球在地化」：從地方到世界—文資作為改變動力的實踐

本場國際論壇主題「全球在地化」，檢視產業文化資產置於不斷變化、推進的文化景觀與日新月異時代的「重新加載」，反思其新興或潛在的價值意義。首場由 TICCIH 2022 大會主辦人，加拿大魁北克大學 Lucie Morisset 教授分享「大時代下的工業村：工業遺產構築的全球在地化鏈結」，她回顧工業遺產全球在地化，呈現出工業遺產圖譜的全貌，並以加拿大工業村亞維達為例，以「營造美好社會」為規劃方向的工業村，給我們帶來的啟發與意義。來自荷蘭的歐洲工業遺產之路 (ERIH) 創會副主席 Hildebrand de Boer 先生，帶來「歐洲工業遺產：驗證確認、細心了解、歡慶多元」，提出工業遺產有助於定義社區和個人的身份認同，更提供就業機會，此外，工業遺產對所在城市作出積極的貢獻，讓人們了解到現在與未來的歷史價值，即是「產業文化資產與地方學的結合」體現；本場次也邀請到荷蘭遺產實踐組織創辦人 Hasti Tarekat 女士與談，分享歐洲當地青年參與產業文資活化的經驗，以及文資世代傳承的永續力。

誠如文化部陳登欽主秘致詞時所言，在大時代的轉變中，各國各地各自經歷著不同的事件，也面臨著不同的文化保存議題，但都透過文化資產的活化經驗，將各自的

of TICCIH 2022. With the topic “Company Towns in the Age of Discontinuity- Industrial Heritage as a Glocalized Relationship to Be Rebuilt,” she examined the global localization of industrial heritage, presented a full picture of mapping industrial heritage, and took the Canadian company town, Arvida, as an example of the inspirational vision “Building A Better Society.” The second keynote speech was given by Mr. Hildebrand de Boer from the Netherlands, the founding vice president of the European Route of Industrial Heritage (ERIH). He spoke about “Industrial Heritage in Europe: Validate, Sensitize, Celebrate,” and noted that industrial heritage shapes the identity of communities and individuals and creates employment opportunities. He also explained that industrial heritage makes a positive contribution to the city in which it is located, and that enabling people to understand the historical value of the present and the future is an example of “combining industrial heritage research and local studies.” This session also invited the founder of Heritage Hands-on, Ms. Hasti Tarekat, to be the panelist to share her experience of engaging local youth in heritage revitalization in order to pass on cultural legacies from generation to generation.

As noted by Mr. Teng-Chin Chen, Secretary-general of the Ministry of Culture, in his welcoming remarks, while countries around the world have different historic trajectories and are facing different cultural conservation issues, they could all archive and conserve their individual circumstances and cultural contexts through cultural heritage revitalization and spark new ideas and creativity. In the last session of the forum, renowned scholars from Taiwan graced the forum with their presence and participation, including Prof. Ya-Ning Yen from China University of Technology; Prof. Kuang-Chung Lee from National Dong Hwa University; Prof. Hsiao-Wei Lin from Chung Yuan Christian University; Prof. Sin-Heng Wang from National Yunlin University of Science and Technology; Prof. Zhen-Hui Liu from Providence University; Mr. David Gong, Director of Taiwan Coal Mine Museum; and the railway heritage expert, Dr. Nai-Yi Xu. They shared their international collaboration experiences in the field of cultural landscape, mining, heritage railway, and interdisciplinary partnerships, while exploring how new relationships have been gradually formed between Taiwan’s cultural heritage communities, young generations, and local residents in recent years. This echoes the international speakers’ perspectives on the new value of contemporary industrial heritage.



Figure 1. A group photo session at the opening of the “International Forum of Industrial Heritage: Glocalization”.

圖 1：國際論壇開幕合影¹。

環境、文化脈絡記錄下來，成為激發新思考、新創意的靈感來源。第三場由中國科技大學閻亞寧老師、東華大學李光中老師、中原大學林曉薇老師、雲林科技大學王新衡老師、靜宜大學劉鎮輝老師、新平溪煤礦博物園區龔俊逸董事長、鐵道研究者許乃懿醫師等，分別就文化景觀、礦業、鐵道與跨域合作的國際交流經驗，探討產業文化資產與臺灣年輕世代和當地居民的共同身分逐步建立起新的關係，回應三位國際講者對產業文化資產在當代呈現新價值思考的提問。

10月8日「交流會議」：自然與文化之旅的跨域加值

交流會議以跨域整合保存、加值活化，以及永續發展等三大面項的「實務交流」，接軌「自然與文化之旅」的國際文化資產保存趨勢。首場由 ANIH 指導委員會召集人暨中原大學建築系林曉薇老師回顧影響 ANIH 的成立，結合國際組織串聯全球工業遺產網絡；新北市立黃金博物館教育研究組駱淑蓉組長，分享近年推動的參與式預算、礦山藝術季、國際交流與礦山學等嘗試，以跨域、創新、整合以及扎根永續，讓產業博物館得以兼顧政策要求與民眾期待。

國際文化紀念物與歷史場所委員會 (ICOMOS) 澳洲國家前主席，現任衍生遺產顧問公司總監 Ian Travers 先生帶

¹ On the projection screen, from left to right: Ms. Hasti Tarekat; Mr. Hildebrand de Boer; Prof. Lucie Morisset. In the front, from left to right: Prof. Ya Ning Yen; Prof. Kuang-Chung Lee; Ms. Man-Yuan Lin, Chief-secretary of the Bureau of Cultural Heritage; Mr. Teng-Chin Chen, Secretary-general of the Ministry of Culture; Prof. Hsiao-Wei Lin; Prof. Zhen-Hui Liu; Mr. David Gong, Director of Taiwan Coal Mine Museum; and Dr. Nai-Yi Xu.

後排螢幕由左至右：Hasti Tarekat 女士、Hildebrand de Boer 先生、Lucie Morisset 教授；前排由左至右：閻亞寧老師、李光中老師、文資局林滿圓主秘、文化部陳登欽主任秘書、林曉薇老師、劉鎮輝老師、龔俊逸董事長、許乃懿醫師。

“Industrial Heritage Conference: Interdisciplinary Value-Added” on October 8th: Interdisciplinary Value Creation in Journeys to Natural and Cultural Heritages

This conference was themed on practical experiences of interdisciplinary and integrated conservation, value addition and revitalization, and sustainable development of industrial heritage, in an attempt to align with the international heritage preservation trend of promoting “journeys to natural-cultural heritages.” In the first session, Ms. Hsiao-Wei Lin, Chair of the Advisory Committee of ANIH and Associate Professor from Chung Yuan Christian University, introduced the establishment of ANIH as well as the international industrial heritage organizations and networks that contributed to its establishment. In the second session, Ms. Shu-Jung Lo, Chief of Education and Research Section, Gold Museum, shared her recent projects in promoting participatory budgeting, the MINE Art Festival, international exchange, and mining studies. The goal of these projects is to enable industrial museums to meet both policy requirements and public expectations through interdisciplinary, innovative, integrated, and sustainable approaches.

In the third session, Mr. Ian Travers, Past President of Australia ICOMOS and Director of Extent Heritage, Australia, shared Australian case studies on the cultural and natural values of historic water systems, outlined the difficulties of balancing natural and cultural preservation, and proposed possible solutions from aboriginal perspectives. In the fourth session, Mr. Kyriakos Efstathiou, Professor from Cyprus University of Technology and UNESCO Chair on Digital Cultural Heritage, introduced his archaeological studies of ancient sciences and suggested that ancient Rome technologies had the potential to drive early-stage industrial revolution. In the fifth session, Prof. Chun-Hsi Wang from the Graduate Institute of Folk Arts and Cultural Heritage, National Taipei University, shared his experience of participating in the International Scientific Committee on Cultural Landscapes (ICOMOS ISCCL) and discussed the cultural landscape conservation needs of the sugar industry in Taiwan by drawing on international cases from France, India, and Ireland.

The final session of the conference was a panel discussion entitled “The Cultural-Natural Journeys of Industrial Heritage,” moderated by Mr. Tse-Fong Tseng,

來歷史水系統的文化 and 自然價值的澳洲案例分享，梳理如何兼顧自然保育與文化保存兩難，提出從原住民視角切入的可能解方；賽普勒斯科技大學教授聯合國教科文組織數位文化遺產教席的 Kyriakos Efstathiou 教授，引介科技考古觀點，提出羅馬時代工業革命的可能想像；臺北大學民藝文資所王淳熙老師則分享其參與 ICOMOS 文化景觀科學委員會的經驗，借鏡法國、印度與愛爾蘭等國際案例，回應對國內的糖業文化景觀的期許。

會議壓軸綜合座談主題為「產業文化資產文化 - 自然之旅」，由 ANIH 指導委員之一的國立高雄大學曾梓峰老師主持，林務局阿里山林鐵及文資處黃妙修處長分享從自然保育轉型產業文化資產保存的歷程；國立臺北科技大學張崑振老師分享糖業產業文化景觀之觀察；國立臺灣博物館林一宏副研究員則述說國立臺灣博物館作為自然科學博物館涉入產業文化資產保存的經驗。

10月14-18日「青年工作坊」：實現未來的設計培力

本次青年工作坊國內外青年團隊共計七組，包括中原大學建築系的新竹第六燃料廠、臺北科技大學建築系的出磺坑文化景觀、韓國漢陽大學建築系的聞慶雙龍洋灰場、臺北大學民俗藝術與文化資產研究所的烏山頭水庫暨嘉南大圳水利系統、中國科技大學規劃設計學院與管理學院團隊的建國啤酒廠、成功大學創意產業設計研究所的阿里山林業暨鐵道文化景觀，以及賽普勒斯科技大學的數位遺產專題。

工作坊首日的國際專題，邀請澳洲新南威爾斯州公共工程諮詢機構遺產環境規劃主任 Bruce Pettman 先生、紐西蘭環境保存部遺產技術顧問 Paul Mahoney 先生，以及荷蘭遺產實踐組織創辦人暨 ANIH 指導委員會副召集人 Hasti



Figure 2. The workshop participants visited the Suantou Sugar Refinery and rode on the narrow-gauge sugar train kept by the Sugar Refinery.

圖 2：工作坊學員參訪嘉義蒜頭糖廠，搭乘糖廠保存之五分車列車。

Member of Advisory Committee of ANIH and Professor from National University of Kaohsiung. During the seminar, Ms. Miao-Hsiu Huang, Director of Alishan Forest Railway and Cultural Heritage Office, spoke about the shift of the conservation policy of Alishan Forest Railway from nature conservation to heritage preservation; Prof. Kun-Chen Chang from National Taipei University of Technology shared his observations on the cultural landscape of Taiwan's sugar industry; Mr. Yi-Hung Lin, Associate Researcher of the National Taiwan Museum, described how National Taiwan Museum, as a natural science museum, has been involved in preserving industrial heritage.

“Youth Hands-on Workshop on Industrial Heritage” from October 14th to 18th: Enhancing Design Capability to Realize Future Visions

The youth hands-on workshop was attended by seven teams of college students from Taiwan and abroad. They were teams from the Department of Architecture, Chung Yuan Christian University, Taiwan (Hsinchu branch of the Imperial Japanese Army's Sixth Fuel Factory); Department of Architecture, National Taipei University of Technology, Taiwan (Cultural Landscape of Chuhuankeng); Department of Architecture, Hanyang University, South Korea (Ssangyong Yanghoe Plant in Mungyeong); Graduate Institute of Folk Art and Cultural Heritage, National Taipei University, Taiwan (Wushantou Reservoir and Chianan Irrigation Waterway); College of Planning and Design, China University of Technology, Taiwan (Jianguo Brewery); Institute of Creative Industries Design, National Cheng Kung University, Taiwan (Alishan Forestry Industry and Forest Railway Cultural Landscape); Department of Electrical Engineering, Computer Engineering and Informatics, Cyprus University of Technology, Cyprus (Digital Cultural Heritage project).

On the first day of the workshop, international experts were invited to give lectures on topics of “Integration, Innovation, and Sustainability” to broaden the youth's horizons. Invited speakers included: Mr. Bruce Pettman, Director of Heritage, Environment & Planning for NSW Public Works Advisory, Australia; Mr. Paul Mahoney, Senior Heritage Advisor for the National Office, Department of Conservation, New Zealand; and Ms. Hasti Tarekat, Founder of Heritage Hands-on, the Netherlands, and Co-chair of the Advisory Committee



Figure 3. A group photo of students, supervisors, and international speakers on the first day of the “Youth Hands-on Workshop on Industrial Heritage”

圖 3：工作坊首日學員、指導老師與國際講者合影³。

Tarekat 女士，分別以「整合」、「創新」與「永續」破題，為青年團隊拓展視野。兩天線上工作坊國際講座部分，在 10 月 15 日邀請韓國國立古宮博物館李受靜博士分享韓國產業文化資產保存概況，以及賽普勒斯科技大學聯合國數位遺產教席的 Marinos Ioannides 教授分享數位技術導入文化資產保存應用實例；16 日則邀請中國科技大學施登騰老師介紹以「數位轉譯」導入文化資產加值運用的國內外案例。工作坊操作以「設計思考」對應分析、理解、創新、整合、永續等五力，由指導老師們共同設計出題，激盪各組提案內容討論與交流。

17 日安排參訪嘉義蒜頭糖廠 - 工業聚落景觀，以及仍在運作的雲林虎尾糖廠 - 活態產業文化現場，體驗五分車搭乘、製糖工業地景與歷史現場，感受糖業文化資產場域的不同風貌與經營模式；並於綜合討論時間拋出四個提問給青年團隊思考，包括工業革命與數位革命的反思、當代社會與工業遺產的連結、產業變遷轉型下的勞工議題，以及體驗經濟在產業空間的實踐等。18 日的成果發表會，評審群針對各青年團隊提案內容，以及呼應聯合國全球永續發展目標 (SDGs) 與文化指標的程度，提出回饋與建議。青年團隊的提案構想，受到各校指導老師們的肯定與讚賞，現場國內外青年學子交流氣氛熱絡，反映在日新月異的現代社會與不同世代的可能想像，彰顯產業文化資產獨特的多元價值與創新潛力。

本次「In the PLACE · 在此一方」系列活動透過國際論壇、交流會議、工作坊研討、產業文資個案研究與場

³ On the left of the projection screen: Mr. Paul Mahoney; on the right of the projection screen: Mr. Bruce Pettman.
螢幕左方：Paul Mahoney 先生；右方：Bruce Pettman 先生。

of ANIH. Also included in the program was a two-day online workshop featuring more talks by international speakers. On October 15, Dr. Lee, Sujeong from the National Palace Museum of Korea presented an overview of industrial heritage preservation in Korea, while Dr. Marinos Ioannides, UNESCO Chair on Digital Cultural Heritage, Cyprus University of Technology, shared case studies about the use of digital technology in heritage preservation. On October 16, the workshop was joined by Prof. Deng-Teng Leon Shih from China University of Technology, Taiwan, to introduce domestic and international cases of using “digital translation” to add value to cultural heritage. In terms of hands-on activities, the youth teams’ supervisors jointly designed questions to facilitate discussions and exchanges among the youth, aiming to equip them with the “design thinking” mindset and the five capacities of analysis, understanding, innovation, integration, and sustainability.

The workshop participants also visited sugar refineries in Taiwan on October 17. They visited the Suantou Sugar Refinery in Chiayi to learn about the industrial settlements there. Then they visited the Huwei Sugar Refinery in Yunlin, a living industrial heritage site which is still in operation, where they rode the narrow-gauge sugar train, explored the landscape and heritage buildings, and learned about the various business models of different heritage site. After the visits, students were asked to reflect on four topics: industrial and digital revolutions, the connections between contemporary society and industrial heritage, the labor issues arising from industrial transformation, and how the concept of “experience economy” is practiced in industrial spaces.

On October 18th, the youth teams delivered their final presentations on conserving the industrial heritage site of their choice. After each team made their presentations, the panel of judges provided feedback and suggestions regarding the content of the presentation and the extent to which it corresponded to the UN Sustainable Development Goals (SDGs) and cultural indicators. All the teams were complimented by the judges on their excellent presentations. The lively exchange of ideas between students from home and abroad reflected the convergence of creative perspectives of different generations, while highlighting



Figure 4. The workshop participants discussed and integrated the findings of the field visits into their research themes.

圖 4：工作坊學員就實地參訪所得與研究主題，進行分組討論與發想。

域遺址實地體驗，啟發青年學員觀察及體會產業文化資產的歷史意義、保存維護現況、可能經營困境、活化再利用方式與在地城鄉發展關係，激發青年團隊對個案場域提出可能的創意行動方案，鼓勵對產業文化資產保護的持續關注。本系列活動匯聚來自不同國家、世代的觀點交流探究，鏈結臺灣與國際產業文化資產於瞬息萬變的現代生活中，所面對的共同契機、共同挑戰，並開啟臺灣與國際丰姿各異的產業文化資產未來攜手合作的無限可能性。期許本屆青年團對學員成為未來亞洲以至國際產業文化資產網絡的重要實踐者，搭建產業文化資產保存專業經驗傳承之機會，促發創新思維與願景，落實 ANIH 推動亞洲青年合作交流之工作目標。⁴

⁴ More information can be found at http://aniphyouth2021.cute.edu.tw/index_en.html, on the official ANIH website at <https://aniph.culture.tw/index/en-us>, and on Facebook at www.facebook.com/ANIH.ASIA. 完整活動內容可上網瀏覽 aniphyouth2021.cute.edu.tw/index.html，與 ANIH 官方網頁 aniph.culture.tw/index/zh-tw，及臉書 www.facebook.com/ANIH.ASIA。



Figure 5. The narrow-gauge sugar train at the Suantou Sugar Refinery (left) and the alcohol tank of the Huwei Sugar Refinery (right).
圖 5：蒜頭糖廠五分車（左）與虎尾糖廠酒精槽（右）。

the unique and diverse value of industrial heritage and its potential for innovation.

The 2021 International Youth Forum Activity Series featured an international forum, a conference, a hands-on workshop, various discussions and case studies of industrial heritage, as well as study visits to heritage sites. The goal was to inspire young participants to learn about and recognize the historical significance, current preservation state, and possible operational difficulties of industrial heritage, as well as its adaptive reuse and relationship with the development of local communities. In the workshop, youth teams proposed innovative, actionable solutions for conserving heritage sites and were encouraged to keep abreast of current preservation issues of industrial heritage. The series of events brought together perspectives from different countries and generations. The exchange and exploration of viewpoints mirrored the opportunities and challenges

faced by Taiwan and the international industrial heritage sectors in today's ever-changing world. They also opened up infinite possibilities for collaboration between Taiwan and international heritage communities in the future. It is hoped that after attending this year's activity series, the student participants could grow to become heritage conservation practitioners and participate in Asia's or the world's industrial heritage networks, as they pass down the legacy and professional expertise in industrial heritage conservation. The activity series this year has successfully inspired innovative ideas and visions and helped to realize ANIH's goal of promoting youth cooperation and exchange in Asia.

The Industrial Heritage of “Company Towns” As A Case of Glocalization in the Age of Discontinuity

「工業村」的工業遺產：不連續時代的全球在地化

Lucie K. Morisset (Professor and Chairholder of the Canada Research Chair on Urban Heritage, University of Quebec in Montreal)

加拿大魁北克大學蒙特婁分校城市遺產研究教席 / 教授 露西·莫里塞

This paper discusses a particular dimension of industrial heritage: worker's settlements, more specifically worker's settlements built around factories, by the private sector, mainly in the 19th and the 20th centuries, and especially that of the 20th century. That heritage of the second industrial revolution is now, more than ever, threatened by deindustrialization, that is causing large areas of land to be just abandoned, destroyed, de-qualified, together with large areas of the history and, more important, of our collective memory. I am calling this phenomenon “discontinuity” in the line of Peter Drucker, (1969), who was with these terms describing a change from a society based on the production of goods – through industry – to a society based on the sharing of information – through digital technologies, for example –, a change that is also modifying deeply our societies, our cultural memory and what we feel is our can be common in communities or to mankind

Company Towns or Workers Settlements as utopias

As in Jiufen (Taiwan), Hashima (Japan), Nord-Pas-de-Calais (France), South Hedland (Australia) or Arvida (Canada), on which I will come back, “company towns” or “workers settlements” exist in most parts of the world, especially for those created in the 20th century by large multinational companies that were seeking resources further and further away from established cities and, hence, needed to house their workers in some way. They had to house them even more that workers had become much more mobile than in the 19th century and could easily switch from one company to the other if their working and living conditions proved unsatisfactory. So these company towns of the Second Industrial Revolution were pretty much experiments into making cities liveable and creating belonging in communities.

Some of them, as that town of Arvida to which I will be referring later, even invented the housing formulas

本文探討工業遺產領域一個特殊面向：工人聚落，更確切地說，主要是私人企業在 19 至 20 世紀，特別是 20 世紀，建於工廠周圍的工人聚落。這些遺留自第二次工業革命的工業遺產如今正遭受前所未有的「去工業化」（deindustrialization）威脅；大量土地被遺棄、毀壞、「去資格」（de-qualified）。一併失去的還有大量歷史，以及更重要的，我們的集體記憶。我將此現象稱為「不連續」（discontinuity），借用彼得·杜拉克（Peter Drucker）1969 年出版的書中說法。杜拉克將「不連續」描述為一種：「從工業以生產商品」轉變為「通過數位科技以共享訊息」的社會變化，此變化不僅深深改變我們的社會和文化記憶，也讓我們對社區和人類的共通點有了不同看法。

工業村或工人聚落作為烏托邦城鎮

臺灣的九份、日本的端島、法國的北卡萊海峽、澳洲的南黑德蘭、加拿大的亞維達（Arvida，稍後會詳述）都是「工業村」或「工人聚落」之所在地。工業聚落遍布全球，主要建於 20 世紀，當時，大型跨國企業為了尋求資源，逐漸轉往離成熟城市越來越遠的地方進行開發，由於地處偏僻，為工人提供住所在 20 世紀變得更加重要，因為那時候的工人流動率較 19 世紀高出許多，若公司不能提供令人滿意的工作和生活條件，工人很容易轉往其他公司。也因此，這些因第二次工業革命出現的工業村，可謂是「打造宜居城市、創造社區歸屬感」的各種社會實驗。

當中有些工業村，例如稍後會介紹到的亞維達，甚至發明了「住房公式」，這些公式後來在政府推展住房計畫時被相關當局借用。事實上，第二次工業革命曾讓人們產生了改變人類世界的想法，人們夢想著通過大量生產商品讓生活變得更好。當然，烏托邦的想法並非誕生於工業革命，不過當時公司在規劃城市以提供工人房舍時，會試圖打造更新、更好的聚落；有些私人企業規劃出的工人房舍和生活環境甚至成為了企業的商標特色。

工人聚落就是這樣出現在世界各大洲。它們在多方面相互聯繫，創建出一個共享經驗的「全球經驗領域」。從工人聚落和工業村居民的生活方式可以看出，這些工人的全球經驗來自一個基於「生產商品」的世界。

that were later on borrowed by public authorities when governments started to be involved in housing. As a matter of fact, the second industrial revolution made people dream of changing humankind and making humanity better thanks to the massive production of goods. Of course, the idea of a utopia was not born with the industrial revolution. But when the need to house the workers, encountered urban planning, the quest for new and better settlements went to the point where the workers housing and living environment became the trademarks for some private enterprises.

This is how all these settlements came to colonize whole continents. And how they became, in many ways, interconnected with each other, creating a realm of shared experience, a globalized experience of being, as it was recognized through ways of living in workers' settlements and company towns, a globalized experience of being the root of this world based on the production of goods.

Workers' settlements nowadays, in a world of discontinuity

So that is the legacy: communities of people that were forged by their relationship to a specific work, that gave way to a specific kind of settlements and towns, with factories of course, but also with housing, community buildings, and so on. And that gave way to a global network of shared experiences, of valued experiences.

These company towns are more and more recognised as heritage and included on the World Heritage List. They are, in fact, a new trend in the industrial heritage and in the World Heritage in general. Although, while we know quite a lot now about the heritage of the first industrial revolution, we know much less about the heritage and the cultural memory of that second industrial revolution.

That is now a problem, because it is these settlements that are now massively threatened by closures. Yet, we have learned to manage as heritage the closed settlements of the first industrial revolution; we have made what they call in France "chateaux de l'industrie" and, although industrial heritage still tends to awkwardly focus on plants and factories and machines and other monumental things, we have recreated some former

不連續的時代：工人聚落現況

「工人聚落」就是文化資產。工人社區的形成是一群人因工作關係來到這個特定類型的聚落和城鎮，其中肯定包含了工廠，此外還有住房、社區建築等，居民通過珍貴的共有經驗搭建起一個全球網絡。

工業村的遺產價值越來越受世人認可，並將其列入世界遺產名錄。事實上，工業村儼然是工業遺產和世界遺產的新趨勢。不過，儘管我們對第一次工業革命的遺產知之甚詳，對第二次工業革命的遺產和文化記憶卻不甚了解。

如今這已成為問題，因為工人聚落正面臨大規模的關閉危機。幸好，我們從第一次工業革命的遺產處置經驗中學到如何將關閉的聚落作為遺產來管理；我們建造了法國人所謂的「工業城堡」(chateaux de l'industrie)。雖然如今的工業遺產的保存工作仍不合時宜地大量集中在工廠、機器和其他大型物件上，但我們仍成功將一些過去的礦業市鎮改建為小型露天博物館，或保存其部分文物。

但值得注意的是，工業村的工業遺產由「遺跡」(relics)構成，住在那裡的居民也越來越少，那麼，這些人去了哪裡？在工業村社區走向命運交叉口之際，他們又扮演著什麼樣的角色？

有些工業村成了鬼鎮，有些工業村的舊工廠被改建為博物館，有些聚落被重新利用、轉化為當地城市的文化資產，但在大多數的案例中，工業記憶在重建中的作用很小；所有的烏托邦城鎮、歷史經驗，乃至於整個地區曾有的品牌或商標特色都退居一旁、讓位給「新品牌營造」。

總之，工業遺產轉化的過程，傾向將人和社區摒除在外。有些城市重建會利用特定主題或其他形象打造城市品牌，但同時，有些城市卻仍然缺乏能助其發展的新資源。

工業村、工業遺產及「雙重取代 / 位移」

工業遺產和多數古老或偉大遺產一樣，主要以遊客作為目標族群。這樣的傾向在工業遺產中尤其明顯，因為人們相信遊客能帶來收入、彌補工廠關閉的損失，並為失業的產業工人提供就業機會，讓經濟之輪重新轉動，進而帶動社會運作。

我們如今知道這種功利主義的願景並不可行。產業工人不會從事旅遊業工作，此外，經濟學家也指出「工作承諾」不足以說服工人從原先居住的工業村搬移至他地，因為他們對過去的共有經驗有很深的依戀，意義遠勝於他處未知的未來。時至今日我們也明白到：社會不會跟著經濟走，而是經濟跟著社會走。

mining towns as small open-air museums, or preserved parts of them as artifacts.

It has to be noted, however, that these heritage are made of “relics.” Less and less people live there anymore. So where do these people go? What is their part in this destiny of their community?

Besides ghost towns, some old factories of these towns are turned into museums, and some settlements are re-used and developed as heritage parts of the city. But in most cases, the industrial memory counts for very little in the redevelopment, and all the utopia, all the historic experience and all that was once the brand, the trademarks of entire districts just makes place for new branding.

In sum, that industrial heritage tends to exclude the people and the communities and while the redevelopment of cities often targets themes or other figures of urban branding, at the same time, some places are left in a very bad need of a new source of growth.

Company towns, industrial heritage and the “double displacement”

That is because, as most old or grand heritage, industrial heritage is largely targeted at tourists. It is the case even more as it is believed that tourists will bring back in the revenue lost with the industrial closures and, by giving employment to the unemployed industrial workers, restart the wheel of economy, and thus society.

We now know that this utilitarian vision does not work. Industrial workers will not take on some jobs in the tourism industry. Moreover, economists have shown that the promise of jobs does not suffice to convince workers to move from their former company town to somewhere else, as the attachment to the past shared experience counts more to them than an uncertain future elsewhere. We now know that society does not follow economy. Economy follows society.

These working people, who were once at the center of this industrialized world, were just set aside – that is, actually, when we mainly started talking about “the working class” being a condition of suffering. Through



Figure 1. The company town of Arvida seen around 1945. (Photo credit: Rio Tinto)

圖 1：1945 年代左右的工業村亞維達。（資料來源：力拓礦業公司）

工業村的工人曾經處在工業化世界的中心，後來退居一旁，也是從那時起，我們開始談論「工人階級」處境有多艱難。他們失去全球網絡、失去共有經驗，失去價值，現在還將失去他們的生活環境；他們成了一種「殘餘」，僅堪承載著一段記憶。學者在描述「去工業化」這種社會轉型的成因和影響時，常用到「取代/位移」（displacement）一詞。工廠居於生產中心的地位被取代、移至他處後，工人也無法逃離被取代的命運。有些工人仍住在原有的工業村，境遇較糟的已被迫遷移，對這些工人而言，他們正在經歷空間和時間上的「雙重取代/位移」：工廠關閉導致工人逐漸失去其全球網絡，此為「空間上的取代/位移」；工人不再是物質和象徵環境未來發展的基石，而是過去的殘餘，此為「時間上的取代/位移」。

因此「去工業化」的世界正在面臨衰敗的命運。工業遺產佔據不少土地範圍、擁有一些居民及烏托邦式產物，這些曾是 20 世紀工業化世界的核心。

這些曾經的烏托邦、這些通過身份認同和社會計畫建造出來的工人聚落，是否能以遺產形式找到新出路？或者更進一步，它們能幫助我們找到遺產管理的新方法嗎？它們能如何協助我們重建去工業化過程所遺留下的社會和經濟現況？

「工業村」作為工業遺產：重新創造空間和時間的連續性

順著這個思路，我開始將遺產看作一種關係，一種平行於純遺跡遺產的倡議，以及一種能讓社區介入其聚落命運的方式。

losing their global networks, their shared experience, their value, and now their environment, they became a residue, barely a memory. Deindustrialization scholars talk about “displacement” to describe some causes and effects of this transformation of society, as centers of production are displaced to different parts of the world, which in turn creates displacement among the workers. But it might be said, for the working people living in former company towns or even worst ejected from them, that they are living a double displacement: a displacement from space, as their global network of experience fades with the closures, and a displacement of time, as their relation to the material and symbolic environment is no longer a substrate for the future, but a residue of the past.

And so the whole deindustrialized world is left to its decay. With all its utopian content, and very large portions of the territory, as inhabiting this territory, as company towns show, was precisely the core of the 20th century industrialization.

Can these former utopias, these settlements created with an identity and a society project, can these find a new way of life through heritage? Even more, can these workers settlements also help us about ways to manage heritage? How can this help rebuild the societies and the economy left over by deindustrialization?

Company towns as an industrial heritage: to recreate continuity in space and time

It is in that line of thought that I have come to work with heritage as a relationship, as an initiative parallel to the heritage made solely of relics and as an way to involve the communities in the destiny of their settlements.

My proposal is to switch the industrial utopia that gave birth to our workers' settlements to a heritage utopia, to a society project based on the idea that heritage could make the life of people better. In order to do this we need to make heritage act both on a global scale and on the local scale. I use the verb “to act” with purpose, as I consider industrial heritage here as an agent of transformation, that can recreate the continuity in space and time and, thus, bring back to the deindustrialized communities of the company towns their place in the world and their place in history.

我提議將孕育工人聚落的「工業烏托邦」概念轉換為「遺產烏托邦」，推動一個基於「遺產可以使人們生活更好」理念的社會計畫。要做到這點，我們必須在全球和地方範圍同步展開遺產行動。我刻意使用「行動」一詞，因為我將這裡的工業遺產視為改變的動力，可以重新創造空間和時間的連續性，從而使「去工業化」的工業村社區重新找回它們在世界上和歷史上的地位。

全球面向的行動可藉助空間人文學（Spatial Humanities）的最新發展成果。我根據工業村的科學知識、建築歷史，以及日常生活的普遍知識去繪製工業村的「深度工業遺產地圖」，因為使用介面十分直觀，日常生活的普遍知識可以通過口述歷史或使用直接參與地圖繪製的方式取得，目前此深度工業遺產地圖仍處於建置階段。

我們希望將工業村的「殘餘」再次轉化為可以承載經驗的事物，要做到這點，首先需要知識作為支撐，因此，深度地圖繪製的重點在於推廣知識、促進知識發展，同時建置一個能讓「在地經驗」進入國際視野、能讓工業化經驗轉為「全球在地化」的後工業社會網絡。或者也可以說，我們希望藉由繪製深度地圖創造共有經驗，讓那些經歷「雙重取代/位移」的社區能重新在這世界建立起自豪感。

在地面向：作為全方位行動的工業遺產

不過，全球範圍的知識推展與參與，必須以在地的一系列行動作為基礎。為了說明 20 世紀的工業村可以有那些在地面向的作為，接下來我將簡單介紹加拿大工業村亞維達的實驗。過去 30 年來，我一直在亞維達做相關研究。

亞維達是一個「成熟且大型」的工業烏托邦：從最初的工業計畫，發展為城市規劃，再演變成一個旨在增進居民歸屬感和自豪感的社會計畫。當初大型鋁廠周圍數以千計的房舍，被刻意打造成不同風格，並建有眾多社區設施、學校等。

如今，亞維達跟其他遺產地面臨到相同困境。雖然亞維達的工廠尚未關閉（在可預見的將來也不會關閉），但邁入現代化後，員工數量已大幅減少，且過去社會計畫帶給亞維達居民的共有記憶，是新遷入的新一代亞維達人無法共享的。

如今我們正與市政和國家當局合作，試圖通過人們與遺產間的聯繫，重啟社會計畫。我們的目標有二。其一，通過保存「建成遺產」（built heritage）來保持遺產的連續性、維持穩定性，透過爭取外界認可，重建亞維達人的自豪感和歸屬感；其二，保持這種連續性，並推動各種重建居民自豪感和歸屬感的措施，來增強社區體驗，包括邀請

The global aspect can benefit from the recent developments in spatial humanities. This is how I have put together a deep mapping initiative of company towns, that is of the scientific knowledge about them, about their history of their architecture for example, and of the popular knowledge of their day-to-day living as we can grasp it through oral history and through direct participation of the users to the mapping, thanks to its intuitive interface. – this is still in the building phase.

The idea here is to convert residue into something that can bear experience again, and that rests first on knowledge. So the point of this deep mapping is both to support knowledge and knowledge development, and, at the same time, to support a new post-industrial networking that puts on a global scale the experiences lived locally; that glocalizes again the experience of industrialization or, in other words, to recreate pride by replacing the “displaced” communities in our shared experience of the world.

The local aspect: heritage as a holistic action

However, that knowledge and participation put on a global scale have to be based on a set of actions at a local scale. To illustrate in parallel what can be done locally with this specific case of 20th century company towns, I will take briefly the experiment of Arvida, in Canada, a community which I have been working for the last 30 years.

Arvida was a “full blown” industrial utopia: an industrial project, which became an urban plan, a plan for a city, that you can see here, and that became a society project built to foster the belonging and the pride of the inhabitants. This has meant building, around a gigantic aluminum plant, thousands of houses, intentionally designed to be different from one another, together with numerous community facilities, schools, etc.

Nowadays, Arvida encounters the same situation as elsewhere; although its plant has not closed and will not in a foreseeable future, modernization has greatly reduced the number of employees, and new people moving into Arvida do not share the common memory that has defined the society project here.

It is this society project that we are –with the municipal and State authorities– working to reactivate nowadays

亞維達人參與遺產論述、分享他們在亞維達的經歷，特別是老一輩的亞維達人，我們將這些定義為無形文化資產。

我們也推行了一系列的常見措施，例如立法保護建成遺產、修復遺產和景觀、協調利害關係人、制定新的具體政策和細則、設計旅遊發展計畫等等。但在推行這些常見措施的同時，我們特意將遺產敘事融入每個人的生活，希望遺產能在這樣的機制中發揮作用，成為推動整個社區發展的新動力。

我們通過這些方式讓亞維達的居民與社區重新建立關係，從溜冰場、曲棍球場、到教堂等場所，讓「遺產」融入日常實踐。為了提升「身為一名亞維達人」（或成為一名亞維達人）的價值，我們也在人行道或網路上舉辦公開展覽，向大眾介紹亞維達人的生活和工作。

我們啟動「亞維達回憶錄」計畫。今日，去訪談服務於工廠的老員工，已是工業遺產領域相當常見的作法，但當初發起計畫時，這並不常見，且極少有人會將整個社區的日常實踐視為無形文化資產。我們的計畫重點是保存長者極為脆弱的聲音和記憶，但同時也希望通過編輯和在網路上發佈訪談內容等方式，讓更多人明白人們的文化記憶和遺產專家的論述同樣重要。

「亞維達回憶錄」計畫後來催生了一個平行計畫。該原型計畫在養老院和醫院進行，採用相同的訪談模式，但目標換成：提高個人在社區和家人眼中的價值。倚賴的事實有二，其一，亞維達的文化記憶是很強烈的，即使喪失一些認知能力，這些記憶依然烙印在他們腦海，這點已獲得證實。其二，亞維達在外界獲得越來越多認可，這使得亞維達的敘事具有價值，也讓承載著記憶敘事的分享者具有價值。

「亞維達回憶錄」計畫如今已啟動十年，亞維達正在重振聲譽，也收穫越來越多外界的社會認可。越來越多人認為亞維達是個「令人嚮往」的地方，這讓房地產價值不斷攀升，且如今所有亞維達居民都對其房屋的建築模式及歷史瞭如指掌。

重建連續性：從地方到世界

亞維達是個試驗案例，但我相信它不僅能啟發我們思考如何創造遺產、如何以及為何要保護工人聚落，也能幫助我們從「重建連續性」的角度去思考為何遺產能在今日幫助我們建立永續社區。工業遺產是很特殊的遺產領域，依然存在許多未知，但我相信亞維達的試驗，加上「深度工業遺產地圖」計畫，能讓我們更加清楚工業遺產為何有能力協助我們克服世界的不連續性、超越「生產商品」的工業世界遺留下的不連續性。事實上，通過亞維達的案例，

through a relationship between the people and their heritage. Two objectives are targeted here: to maintain the continuity of the legacy through the preservation of the built heritage, in order to sustain stability, but also in order to rebuild the pride and the belonging through a recognition coming from the outside. And to maintain that continuity and enhance the communities' experience through diverse measures designed to re-boost pride and belonging amongst inhabitants, including their participation to the heritage narratives, as we see their experience of life in Arvida, especially that of the older Arvidians, as we define it as an intangible heritage.

So this went through a set of usual measures, as legislative protection of the built heritage, restoration of heritage and landscapes, coordination of stakeholders, new and specific policies and by-laws, design of a tourism development scheme, and so on. But in doing so, because we wanted the heritage to take place in that mechanism and to act as a new development dynamic for the whole community, we aimed specifically at integrating the heritage narrative into each and everyone's life.

That is how we came to renew the inhabitant's relationship with Arvida and to integrate heritage in every day practices, around the skating ring, the hockey arena, the church, and so on. Thus we aimed at enhancing the value of « being an Arvidian » (and even of becoming one), for example through public exhibition, on the sidewalks and on the Internet, public exhibition of the life and work of some Arvidians.

This was the launch of the « Memories of Arvida » project. Nowadays, it has become quite common to interview old workers in industrial heritage development. But it was not that common when we launched this project, but what was even more uncommon was to consider the whole community's every day practices as an intangible heritage. Our point here was, of course, to safeguard the very fragile voice and memories of the elders. But also, through the edition and publication on a website of the interviews, to promote the idea that the people's cultural memory are to be considered equal to the heritage expert's narratives.

This led to a parallel prototype project in retirement



Figure 2. A few of the company towns currently mapped as the basis of our deep mapping project (quite a lot are still missing!). (Photo credit: Canada Research Chair on Urban Heritage)

圖 2：「深度工業遺產地圖繪製」計畫已繪製數個工業村，作為計畫開展之基礎，但仍有不少工業村尚待收編繪製。（資料來源：加拿大城市遺產研究中心）

我們看見作為工業遺產的工業村仍可供人居住，也看見工業遺產並非僅能被視為文物、殘骸、遺跡的集合體去處理；它也能被以一種人類現象去對待。由此，我們似乎正從一個生產商品的社會，走向一個共享訊息的社會；遺產不僅是需要被保護的物件，更是需要被分享的資訊。

工業村可以幫助我們反思「遺產」在這個不連續世界中的功能和意義，因為工業村既是現今居民生活的聚落，亦是過去發展的遺跡。但如果我們希望遺產的這兩個面向能續存於當今，就必須同時在全球與地方層次上，準確投資其生活環境及功能，並且必須如當初工業村那樣，營造能讓居民擁有自豪感與歸屬感的意義。為了做到這點，我們需要讓大家更加了解工業村和工人聚落，將工業遺產、特別是工業村，視為創造「歸屬感」與「自豪感」的原動力，不再將遺產單純視為需要「被保存」的物件，而是將其視為需要「被分享」的資訊。

這是工業遺產如今向我們發起的挑戰。

homes and hospitals, sharing the same path, but dedicated to enhance the value of the person in the community and in the eyes of his or her family. We count here on two facts: first, that the cultural memory of Arvida is so strong that it stays in the mind of people even when they are affected by cognitive loss, which has proven to be true; and that the growing recognition gained by Arvida way beyond its frontiers gives value to the narratives of Arvida, and thus value to the person carrying and sharing these narratives.

Today, 10 years after the launch of the “Memories of Arvida” project, Arvida is, in fact, regaining its name and its social recognition outside the municipality. More and more people find Arvida “desirable” to the point that the real estate values are increasing and that all inhabitants nowadays know perfectly the architectural model of their house and its history.

Rebuilding continuity: from the local to the global

Arvida is, of course, a test case. But I believe that it can help us think, not only of how to make heritage, or how and why to preserve worker’s settlement’s, but why heritage, when it is considered through the lens of rebuilding continuity, can help build sustainable communities nowadays. And together with the global deep mapping project, I believe that such an experiment can help us master better how industrial heritage, as a very specific and still quite uncharted field of heritage, has the power to overcome the discontinuity of our world, to go beyond that discontinuity that has left beyond that industrial world based on the production

of goods. As a matter of fact, with the industrial heritage of company towns as living environments, and the possibility to address this heritage as a human phenomenon and not only as a collection of artifacts or residues or relics, we seem to be moving from a society based on the production of goods to a society aimed at the sharing of information: heritage is thus at least as much a good to preserve as it is an information to be shared.

Company towns can help us reflect on the function and the meaning of heritage in our world of discontinuity because they are both a living environment and a relic of the past. But if we want both of these aspects to survive the present time, we need precisely to reinvest the living environment that they are, to reinvest their functionality, with meanings that can support the pride and the belonging of their inhabitants, as the company towns used to be built to support their pride and their belonging, both on a global and on a local scale. In order to do this, we now need to: develop our knowledge on company towns and workers settlements; address industrial heritage, especially in company towns, as an agent of belonging and of pride; and think of heritage maybe less as goods to be preserved and surely more as information to be shared.

It is to that challenge that industrial heritage invites us now.

ERA Chair in Digital Cultural Heritage Project MNEMOSYNE at the Cyprus University of Technology - The Case Study of the Antikythera Mechanism

賽普勒斯科技大學數位文化遺產歐洲研究區計畫「MNEMOSYNE」

Kyriakos Efstathiou (EU ERA Chair on Digital Cultural Heritage, Digital Heritage Research Laboratory (Cultural Informatics), Department of Electrical Engineering and Computer Engineering and Informatics, Cyprus University of Technology)

數位文化遺產歐洲研究區主席 (ERA Chair)，賽普勒斯科技大學電機工程與電腦資訊工程學系「數位文化遺產研究實驗室 (文化資訊學)」 *Kyriakos Efstathiou*

Project MNEMOSYNE

The MNEMOSYNE project aims to define and create holistic documentation 'pipelines' for specific user communities, as well as standards for 3D documentation and knowledge management in Digital Cultural Heritage. Also, as part of the project's activities, a Centre of Excellence in Digital Cultural Heritage will be established. Moreover, an online Master's programme in Cultural Informatics will be developed.

The research topics include: Digital Cultural Heritage (DCH) data acquisition and data processing, DCH data modelling, knowledge management and interpretation, preservation, and use and re-use.

The research team consists of the ERA Chair holder and three groups, each of which comprising one Experienced Researcher and two Early-Stage Researchers. Each group will cover two research topics.

MNEMOSYNE 計畫

「MNEMOSYNE 計畫」(「記憶之神」數位遺產計畫)旨在為特定使用者社群界定、創建全方位文檔記錄「管道」，建立 3D 文檔記錄及數位文化資產知識管理標準。此外，計畫也包括建立一座數位文化遺產卓越中心及一套文化資訊學的線上碩士課程。

研究主題包括：數位文化資產 (Digital Cultural Heritage，簡稱 DCH) 的資料收集與處理、數位文化資產資料的塑模、知識管理、詮釋、保存、利用與再利用。

研究團隊包含歐洲研究區主席及三個組別，各組都有一名資深研究員和兩名初級研究員，各負責兩個研究主題。

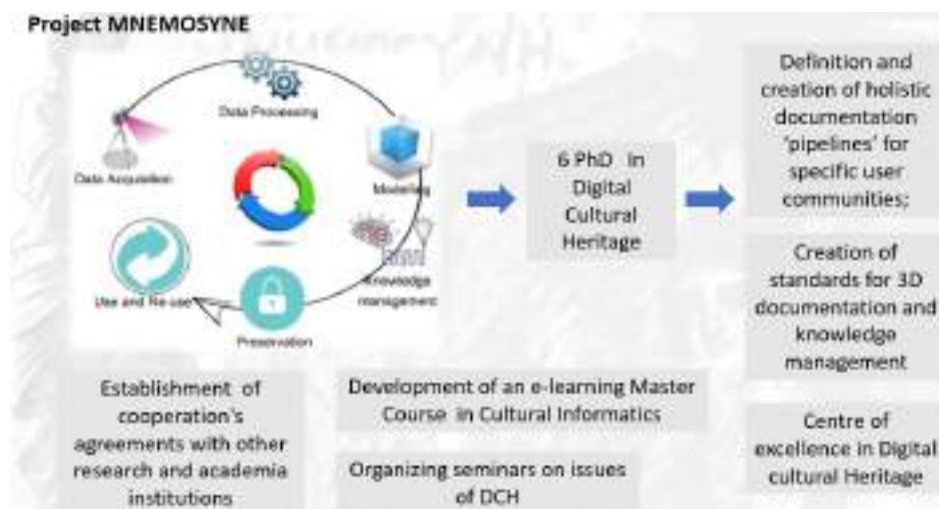


Figure 1. Project MNEMOSYNE.

圖 1：「MNEMOSYNE 計畫」(「記憶之神」數位遺產計畫)。

The challenges to be tackled by the project include:

- Setting up a novel methodology for the identification of tangible and intangible features of sites, monuments and artefacts that can contribute to their exhaustive documentation.
- Identifying the kind of information that needs to be gathered for the Holistic Documentation of every single tangible and intangible feature of a sites, monument or artefact.
- Designing, setting up and developing the appropriate data acquisition pipeline systems by combining various key technologies for gathering information and data flows that can allow the (re)constitution of the hidden history, memory, and identity by following the different ethical principles and methodologies resulting in the production of new knowledge.
- Developing guidelines for the collection of data by different tools and methodologies, which will also include the necessary paradata essential for an accurate and high-quality record of the acquisition processes in measure to support the reuse of the knowledge collected.
- Proposing and developing a format for the metadata schema in order to ensure the preservation of connections between the data, the paradata and the metadata collected, considering the complex nature of CH assets and the wide range of techniques and technologies available that may be used in combination.

Various objects have been selected for investigation during the project based on an analysis regarding the community of users on different objects (tangible and intangible; movable and immovable). The criteria considered for the selection include: historical period, availability of their transportation, material of the objects, existence of texts, inscriptions and representations on the object, and existence of kinematics in different parts of the object. Authorisation has been granted to investigate these case studies, one of which is the Antikythera Mechanism, which has the potential to include all the facets of the project.

Historic, Technological Landmarks of Ancient Greece

The Antikythera Mechanism, together with other historic, technological landmarks of Ancient Greece, like Hero's engine and the Ctesibius water force pump, under the right conditions could have provided the trigger for the industrial revolution many centuries earlier.

計畫面臨的挑戰包括：

- 建立一套全新方法去辨識遺址、紀念物及文物製品的有形及無形特徵以完善遺產文檔記錄。
- 確立需要收集的資訊類別，以全方位記錄遺址、紀念物或文物製品的有形及無形特徵。
- 結合各種收集資訊和資料流的關鍵科技去設計、建立、發展適當的資料收集管道體系，同時遵循不同倫理原則及方法，以構成或重構遺產背後隱藏的歷史、記憶及認同，從而產生新知識。
- 制訂利用不同工具及方法收集資料的準則，包括在資料收集過程中有利於增加記錄文檔之正確性及質量的必要衍生性資料，以強化所收集知識的再利用。
- 提出並制訂「詮釋資料綱要」(metadata schema) 的格式，以確保能保存所收集到的資料、衍生性資料和詮釋資料之間的聯繫，並考慮到文化資產的複雜本質，以及收集資料時可能會結合使用多種技術和科技。

該計畫根據文物使用者進行社群分析（包含有形、無形；可移動、不可移動之歷史文物），選定多項物件實施調查，標準包括：歷史時期、運輸便利性、物件材質、物件上是否有文字、銘文和圖像，以及物件各零件是否運用到力學設計。計畫已授權對一些獲選文物進行案例研究，「安提基特拉機械儀」是其中之一，且很可能會參與本計畫之所有調查面向。

古希臘的歷史性技術里程碑

「安提基特拉機械儀」及古希臘其他具歷史性技術里程碑意義的發明，如希羅的「引擎」和克特西比烏斯的「水泵」，假如在當時有適當條件配合，或許能讓工業革命提早數個世紀發生。

希羅引擎又稱「汽轉球」(aeolipile)，是一種簡易的球形蒸汽渦輪機，通過加熱中間裝水容器帶動輪渦機旋轉，扭矩來自渦輪機噴出的蒸汽射流。「汽轉球」被視為最早利用蒸汽產生動能的裝置，早於工業革命將近兩千年。一直至 18 世紀詹姆斯·瓦特才發明蒸汽機，從而啟動工業革命。

克特西比烏斯的「水泵」則是手動壓力泵，利用空氣去增加雙缸系統中的水壓、迫使水流出，進而產生水柱或便於提取井水。

希羅引擎可能取得什麼樣的成就？如果將汽轉球的轉軸與一個裝有皮帶的滑輪連接，將球體的圓周運動轉移到另一裝置，藉此產生機械運動，讓克特西比烏斯的水泵甚至是某些車輛自動化，這意味工業革命有機會提前 1700 年開始。

The Hero's engine, also known as an aeolipile, is a simple, spherical steam turbine that spins when the central water container is heated. Torque is produced by steam jets exiting the turbine. It is seen as a steam-powered energy source invented nearly 2,000 years ago. (around 18 centuries before James Watt was credited with inventing the steam engine that sparked the Industrial Revolution). It was described almost two millennia before the Industrial Revolution.

The Ctesibius water pump was a manual pressure pump that used air to increase the water pressure in a two-cylinder system forcing the water to come out for producing a jet of water, or for lifting water from wells.

What Hero's engine could do if, for example, a pulley with a belt was attached to the sphere's rotation shaft and transferred the circular motion of the sphere to another arrangement; in this way mechanical movement would be achieved, thus automating the Ctesibius water pump or even some vehicle, meaning that the Industrial Revolution could have begun 1700 years earlier.

The Antikythera Mechanism

The Antikythera Mechanism, which is one of the most complex museum objects with over 100 parts and multiple materials, is a geared mechanism, the first analogue computer in human history, used to calculate with great accuracy astronomical phenomena as for example Moon and Sun eclipses.

In the 1st century BC, a large Roman ship battled with the waves on the rough sea between the mainland of Greece and Crete. Finally, the boat sank on the shores of the small Greek Island of Antikythera. The ship was loaded with works of art and other precious artefacts. Two thousand years later, during Easter of 1900 AD, sponge-divers from the Greek Island of Symi, accidentally discovered the ancient shipwreck off the coast of Antikythera. The underwater excavation began at the end of November 1900 and a few months later important findings were recovered, such as the famous Antikythera Ephebe, most of which are nowadays exhibited at the National Archaeological Museum of Athens. From Pergamon coins that were retrieved, the wreck is dated between 86 and 67 BC.

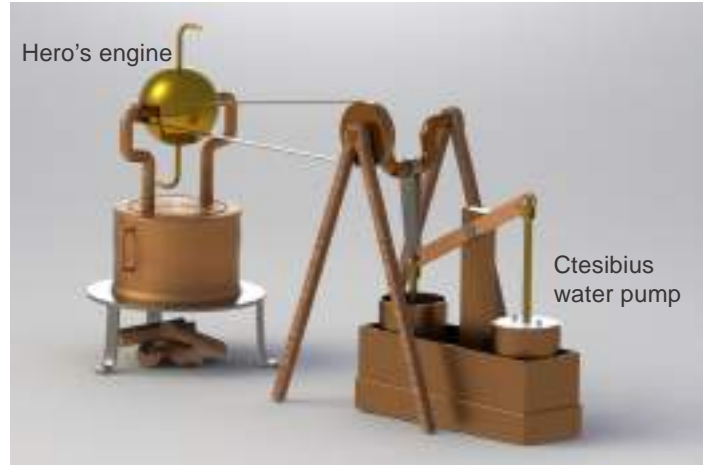


Figure 2. Hero's engine and Ctesibius water pump.

圖 2：希羅引擎 (Hero's engine) 及克特西比烏斯的水泵 (Ctesibius water pump)。

安提基特拉機械儀

安提基特拉機械儀是由上百零件及多種材料製成的齒輪裝置，是最複雜的博物館展品之一，也是人類史上第一台模擬計算機，能精準計算出天文現象，如月蝕、日蝕等。

西元前一世紀，一艘羅馬大船在行經希臘本島和克里特島之間的險惡海域時遭遇洶湧波濤，船隻最終在希臘小島安提基瑟拉 (Antikythera) 的岸邊沉沒，當時船上載滿藝術品和其他珍貴文物。兩千年後，在西元 1900 年復活節期間，於希臘錫米島的採集海綿的潛水員意外在安提基瑟拉島的海域附近發現這艘古老沉船，水下挖掘工作從 1900 年 11 月底展開，幾個月後打撈出一些重要文物，包括知名的安提基特拉青年銅像 (Antikythera Ephebe)，後來這些文物如今大多於雅典考古博物館展出，從打撈出的帕加馬錢幣推斷，沉船年代介於西元前 86 至 67 年間。

沉船文物中有一塊古怪材料已見破損、腐蝕、石化，但其中的青銅痕跡清楚可見。安提基瑟拉沉船的第一份出版物提及該機械儀的存在，並推測其為一種天文裝置。安提基瑟拉機械儀在海底沉睡兩千年後終於重見天日，改變了人們對古希臘技術的現有認知。

安提基瑟拉機械儀是一台技術上令人驚嘆的模擬計算機，建於 2200 年前左右（而後出現的下一台機械計算機要到 1500 年後才建造成功）。此裝置利用古希臘人的天文學及天體運動知識，以偏心齒輪系統（考慮到月球的偏移軌道）建成，展現驚人的準確度。

但安提基特拉機械儀究竟可以計算什麼呢？該機械儀可以用來計算太陽和月亮（也可能包括行星）的周日運動、

application is also used to verify the accuracy in the physical model's predictions, as developed by the research team of the Aristotle University of Thessaloniki. The application has been developed on a Unity platform in 2D format. The dates and zodiac scales on the front side of the Mechanism are redesigned to correspond to the present. A peculiarity of the application, as well as the corresponding physical model, is related to the scale of the zodiac signs. Due to the passage of about 2150 years from its time of construction, and due to the precession of equinoxes phenomenon, the Mechanism's zodiac constellations have rotated by about 30 degrees.

To verify the accuracy of the results, it is possible to compare the results of each prediction with the corresponding predictions from NASA's website (<https://eclipse.gsfc.nasa.gov/>) via a button providing a direct link.

From all the tests that have been performed, we can conclude that the Mechanism accurately predicts the astronomical phenomena of the future and confirms with astonishing accuracy astronomical phenomena of the past. In combination with a physical functional model of the Mechanism, the application helped us to prove that the Antikythera Mechanism was a scientific instrument, the first computer in world history, which accurately predict astronomical phenomena.

It is important to emphasize that from the study of the Mechanism its usefulness in issues related to the present era emerged. For example, it can be used to predict the dates of moveable Christian holidays, such as Easter. Because the date of the celebration of Easter is related to the astronomical phenomenon of lunar phases, which the Mechanism calculates anyway, it is possible without any intervention in its structure to calculate the exact date of the celebration of Easter. Based on this, the possibility of predicting for any year the exact date of the celebration of Orthodox and Catholic Easter, as well as Jewish Passover has been developed in the application. The results of all the tests proved to be accurate.

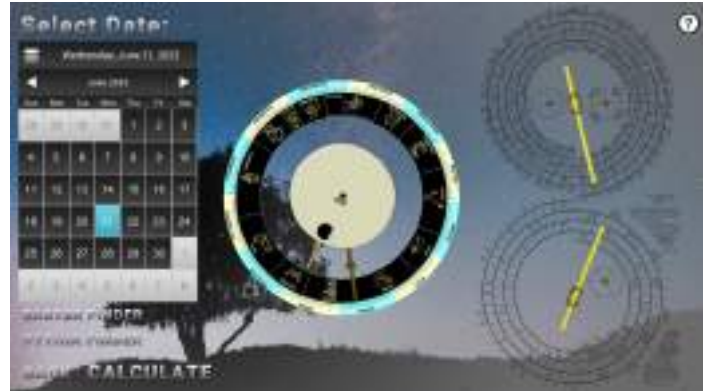


Figure 4. Antikythera Mechanism Application.

圖 4：安提基特拉機械儀（Antikythera Mechanism）應用程式。

計，以對應今日狀況。此應用程式和相應的物理模型都利用到「黃道星座刻度」，由於距離建造之初已相隔約 2150 年之久，加上歲差，該裝置的黃道星座已旋轉了約 30 度。

要驗證結果準確性，可點擊此 NASA 網站連結 (<https://eclipse.gsfc.nasa.gov/>) 將程式的預測結果與該網站的預測結果進行對照。

經過各項測試，我們得出的結論是：該裝置能精準預測未來的天文現象並驗證過去的天文現象，且準確度高的驚人。該裝置的物理功能模型和此應用程式得來的結果，皆證明安提基特拉機械儀是一種科學儀器，是史上第一台能準確預測天文現象的機械計算機。

特別要強調的是，相關研究顯示該裝置也具有解決當代問題的「實用性」，例如可用來預測因年而異的基督教節日日期，如復活節。復活節的慶祝日期與天文現象（月相）有關，而該裝置本就會對此進行計算，所以不需要任何結構調整，就能計算出復活節的確切日期。在此基礎上開發出的應用程式，可預測任一年的東正教、天主教「復活節」及猶太教「逾越節」的確切日期，且測出結果經證實皆為準確無誤。

Interdisciplinary Practice of Industrial Heritage Preservation: The Research and Interpretation of the Jianguo Brewery

以建國啤酒廠為基地的跨域——研究者與轉譯者的產業文化資產保存實踐

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Preface

The Jianguo Brewery (hereafter “the Brewery”), formerly known as the Takasago Brewery, has been making the “Taiwan Beer” for over a century. As a living industrial heritage in Taipei City, the Brewery is tied to the collective memory of the local people. Students from all levels of schools have come to visit this historical site. Apart from enjoying the immersive ambiance, students are drawn to “the people” and their stories associated with the site. These include historical photographs and records of former employees’ strikes, as well as the stories told by the members of the Jianguo Brewery Trade Union (hereafter “the Trade Union”) and the Institute for Historical Resources Management (hereafter “the Institute”) during the guided tours. As a historical site with many stories, the Brewery has organized various educational programs to introduce digital technology into its heritage preservation projects and translate the Brewery’s tangible and intangible cultural heritage into “phygital (physical and digital) educational materials.”

From Heritage Preservation to Heritage Education— The 27-year-long Ongoing Heritage Preservation Movement

序言

百年來守護臺啤的建國啤酒廠（前身高砂麥酒株式會社，下稱「建啤」）是仍能持續產能的文化資產，更是與臺灣緊密聯結的常民記憶。建啤已是臺北市「活態遺產 Living Heritage」的特殊存在，在建啤，各級教育團隊參與且浸入此場域氛圍時，被感動的就是遺留迄今的「人」的故事，像是在廠區看到的歷史照片、抗爭紀錄、以及建國啤酒廠工會（下稱「工會」）與台灣歷史資源經理學會（下稱「學會」）成員導覽時所說的往事，¹建啤是擁有很多「故事」的場所。於是教育工程展開了，目標就是導入數位科技以轉譯有形與無形產業資產成實體數位化「文資教材」。

由保存抗爭走到深耕教育——長達 27 年仍在持續的文資保存運動

建啤於 1919 年時原在郊區，現則位處繁華商圈。加以 1990 年代在公賣民營化進程中，財務壓力加速資產處分，建啤與臺北酒廠、松山菸廠等都面臨著遷廠並拆除的不堪處境。不過，建啤由於生產量未曾中斷、廠內員工數量多、遷廠計畫不合宜等情況下，工會強烈反對並表達工作權訴求，竟而與文資保存訴求同路。在丘如華執行長安排下，澳洲文化資產保存專家 Bruce Pettman、新加坡康偉民建築師、時任東京大學都市工學系的西村幸夫教授等人相繼來臺，進一步提出完整的保存論述。

¹ The Jianguo Brewery Trade Union and the Institute for Historical Resources Management have been working together since 1994 to promote Jianguo Brewery’s heritage preservation movement. The Jianguo Brewery Trade Union is composed of production line workers, many of whom have worked at the Jianguo Brewery for more than 20 to 30 years, while the Institute for Historical Resources Management, formerly known as the Yaoshan Cultural Foundation, was founded in 2004 by a group of people concerned with cultural preservation and sustainable management. Over the years, the Institute has been dedicated to the preservation of a wide range of cultural heritage throughout Taiwan, beginning with the Dadaocheng and Lugang preservation campaigns in the 1980s and continuing with the industrial heritage preservation campaigns from the 1990s onwards for historical sites such as the Zhuzimen Hydro Plant in Meinong, the Taipei Wine Factory, the Songshan Tobacco Factory, the Jianguo Brewery, and the Taipei Railway Workshop, etc.

建啤工會與台灣歷史資源經理學會是 1994 年開始，發起建啤文資保存運動的共同夥伴。工會主要由生產線勞工為主體，許多成員都在建啤工作超過二、三十年以上；台灣歷史資源經理學會於 2004 年成立，前身是樂山文教基金會，由關心文化保存、永續經營的夥伴共同成立，關心議題及足跡涉及全臺，包括 1980 年代發起大稻埕、鹿港保存及 1990 年代起產業文資保存，如美濃竹仔門發電廠、臺北酒廠、松山菸廠、建啤、臺北機廠等處。

The Brewery was built in 1919 in suburban Taipei, which has evolved into a bustling business district over time. In the 1990s, the Taiwan Tobacco and Wine Monopoly Bureau, which operated the Brewery, moved toward privatization and had to expedite the disposal of cultural heritage due to growing financial pressure. Industrial plants such as the Jianguo Brewery, the Taipei Wine Factory, and the Songshan Tobacco Factory were all scheduled to be vacated and demolished. However, the Jianguo Brewery remained in operation over the years. The large number of workers in the brewery made it unfeasible to relocate the plant. To protect the workers' right to work, the Trade Union strongly demanded that the Brewery should not be relocated, which coincided with the cultural heritage preservation movement at the time. Around the same period, at the invitation of Ru-Hwa Chiu, Executive Director of the Foundation, Bruce Pettman, an Australian cultural heritage preservation expert, Wei-Ming Kang, an architect from Singapore, and Yukio Nishimura, a professor at the Department of Urban Engineering of the University of Tokyo, came to Taiwan to discuss heritage preservation in a comprehensive manner.

Later, with the support from many stakeholders, the government approved the preservation plan of the Brewery using a "living preservation strategy" and designated the Brewery as a municipal historical site. Subsequently, the brewery plant, wine storage, and packaging plant in the Brewery were registered as historical buildings. Although the preservation of the Brewery appeared successful, with no previous examples of "living preservation" in Taiwan at the time, as well as the conflicts among various stakeholders, the Brewery was never fully revitalized thirty years after its preservation project began. The reason for the delay is that the foreseeable financial benefits associated with the redevelopment plan have caused a scramble for profits among stakeholders, resulting in less attention being paid to the original intent of heritage preservation.

To resolve these issues, the Institute and the Trade Union have launched various preservation initiatives since 2020, starting by initiating discussions through the public policy participation platform of the Executive Yuan and organizing forums and cultural events. In the same year, the Brewery uploaded three hundred documents and photos to the Taiwan Cultural Memory Bank of the



Figure 1. In September 2020, five hundred teachers and tenth-graders from Taipei Municipal Jianguo High School went to the cultural heritage site, Jianguo Brewery, in three batches to learn about the science of brewing as part of their "Explore and Practice" curriculum.

圖 1：2020 年 9 月建國中學高一探究與實作課程分成三梯次安排了 500 名師生到產業文化資產空間學習「釀造」科。

隨後在多方支持下，不僅獲正式決議保存，並訂下「活保存」方針；也於審定為市定古蹟後，再登錄釀造大樓、儲酒室、包裝工廠三棟歷史建築。保存倡議看似成功，但在缺乏前例與各方勢力介入下，已有近 30 年的遲滯。究其實因，開發利益宛如原罪，驅使垂涎利益分配，保存的初衷反而失焦。

故學會和工會戮力地導正，從 2020 年起發動新的保存行動。首先透過行政院公共政策發起討論，舉辦論壇與文化活動。同時，上傳 300 筆文獻及照片資料到文化部國家文化記憶庫。並與高中課程合作，辦理釀造科學工作坊與美術課程；且與臺灣大學「都市實驗室」合作，提出社會議題解方。

2021 年，再透過文化部產業文化資產創生計畫，進一步與中國科技大學合作；10 月底也在廠區舉辦「百年尚青—產業文化資產與數位科技跨域論壇」。邀請文化資產與數位科技業界、學界跨域對談，並安排多家廠商在論壇現場展示並提供體驗；同年 11 月，受邀參與 2021 臺灣科學節，將建啤活化保存成果以科學教育形式展示。

以往的保存運動常是述及於落實「社會工程」的高遠目標；而其「歷史脈絡（時間元素）」與硬體的「盤點監測（空間元素）」所關注的也是以建物為核心的時空脈絡。然而，唯有「文資」再進一步與「科技」與「人文」去構成三元核心時，方能更聚焦於以「賦義（客體）/轉譯（主體）」為核心的「人」，且才能去觸及「資料性」、「真實性」、「情感性」、「倫理性」等議題。現址保存的雖是文資空間，但始終要面對還是「人」的過去與現在，且



Figure 2. In September 2020, Principal Chien-Kuo Hsu of Taipei Municipal Jianguo High School joined an “Explore and Practice” class and discussed the contemporary significance of industrial heritage preservation with the tenth-graders.

圖 2：2020 年 9 月建國中學高一探究與實作課程。徐建國校長親自到場並全程參與，與同學討論產業文化資產保存在當代意涵。

Ministry of Culture. The Brewery has also established partnerships with schools by offering brewing science workshops and art courses to high school students and by guiding students who were taking a course on “engaged urbanism” at the National Taiwan University to propose solutions to the social issues faced by the Brewery.

In 2021, the Institute participated in the Ministry of Culture’s Creation of Cultural Heritage Program and collaborated with the China University of Technology. At the end of October, the Institute further held the “100 Years of Beer Brewing—Cross-Disciplinary Forum on Industrial Cultural Heritage and Digital Technology” at the Brewery. The forum invited experts from the industry and cultural heritage and digital technology professionals to share their views. In November, the Brewery attended the 2021 Taiwan Science Festival, where the results of the Brewery’s revitalization and preservation efforts were presented for the purpose of science education.

In the past, discussions of industrial heritage preservation tended to focus on the heritage as “a site for social engineering,” as well as the “historical context (time element)” and the “stocktaking and monitoring (spatial element)” of the heritage buildings. However, it is necessary to incorporate the elements of “technology”



Figure 3. In September 2020, Mr. Yo-Ming Yang, Chief Director of the Jianguo Brewery, introduced the biological and chemical properties of beer ingredients and brewing process to the tenth-graders taking the “Explore and Practice” course from Taipei Municipal Jianguo High School.

圖 3：2020 年 9 月建國中學高一探究與實作課程。時為場主任的楊祐銘先生親自為學生介紹啤酒原料與釀造中的生物、化學知識。

應以更大尺度地思考：什麼是「我們想要的城市」？該關注的更是對於過去與當代的思辨。¹而這些概念不僅已作為教學實踐的導論，也是規劃學術論壇的論綱。²

由現址抗爭展向未來工程—從使命到行動所落實的教育實踐

「百年」是時間光景的刻度，也在建啤留下的歷史足跡，且必須透過教育工程為活存工程續能與發光。

因此中國科大學團隊的教育實踐成果，不僅有「儀式設計」、「展演設計」、「文資敘事」、「跨域研討會」等成果，更為建啤留下共約 40 多組包括展區展演設計、歷史照片敘事、導覽動線 wayfinding 設計、意象主視覺設計、實境解密遊戲設計、Baby(北啤)與高砂麥酒系列瓶標設計、ASI (architectural surface as interface 建築構面作為介面) 光雕投影應用、行銷活動等等的提案。也透過施登騰教授在《2021 產業文化資產青年實踐工作坊》將建啤推介給來自臺灣、韓國、賽普勒斯的七組青年團隊。文化保存

¹ The above is an extract from the speeches given by architects Tai-Wen Ho and Ya-Ping Lin at the “100 Years of Beer Brewing—Cross-Disciplinary Forum on Industrial Cultural Heritage and Digital Technology”

摘錄自《百年尚青~產業文化資產與數位科技跨域論壇》中，何黛雯建築師與林雅萍建築師的演講重點。

² The forum is co-curated by Prof. Chih-Yung Aaron Chiu of the National Tsing Hua University and Prof. Deng-Teng Leon Shih of the China University of Technology.

此論壇由清華大學 邱誌勇教授與中國科技大學 施登騰教授擔任共同總策劃人。

and “humanity” to form a three-pillar structure with “people” at its core, creating a concept of “meaning (object)/translation (subject).” This allows us to touch on issues such as “data,” “authenticity,” “emotionality,” and “ethics.” The preservation of cultural spaces is about its “people” because it was the people at the Brewery that constructed the “past” and are involved in creating the “present.” It is also important to think more broadly about the kind of city that we seek to build and our discernment of the past and the present. The above concepts are important references not only for developing educational programs but also for planning academic forums.

Toward the Future of Cultural Heritage Preservation—From Creating Visions to Implementing Educational Practices

The Brewery’s development spans over a century and should be examined over a century-long time horizon. To promote “living heritage preservation” over the long term, education has an essential role to play.

Therefore, the Brewery partnered up with an educational team from the China University of Technology to develop and implement a hands-on digital design course. The course generated a digital archive of the students’ “ritual design,” “exhibition design,” “cultural heritage narratives,” and “interdisciplinary seminars.” Moreover, the students used their creativity to produce forty sets of visual designs for the Brewery’s exhibitions, historical photo story walls, wayfinding signage, and main visuals, as well escape-room style game, bottle label designs for the Baby (Taipei beer) and Takasago series, projection mapping applications of ASI (Architectural Surface as Interface), and marketing activities. In addition to the digital design course, the Brewery has increased visibility through other educational activities. For example, in the “In the PLACE—Youth Hands-on Workshop on Industrial Heritage,” Prof. Deng-Teng Leon Shih introduced the Brewery to seven youth teams from Taiwan, Korea, and Cyprus. These budding designers were the target audience that the Brewery had hoped to engage with, and the project outcome highlighted the creative practice of the young student designers.

In planning the digital design course, the educational team of the China University of Technology arranged intensive activities such as field visits, text and audio-



Figure 4. In September 2020, Mr. Chun-Ta Huang, a researcher from the Institute for Historical Resources Management introduced the history of the century-old Jianguo Brewery and the cultural assets of the beer industry to the tenth-graders taking the “Explore and Practice” course from Taipei Municipal Jianguo High School.

圖 4：2020 年 9 月建國中學高一探究與實作課程。台灣歷史資源經理學會黃俊達研究員為學生介紹百年啤酒廠產業文資歷史。

工程希冀能觸及的年輕族群，以未來設計師身份為「建啤視覺設計工程」完成許多創意發想。

在正式課程教學實踐去推動分組設計前，就已密集安排學生實地參訪、文件閱讀、影音觀賞等前置作業，使收斂於議題解方之設計中，並涵括於整合了理性資料（規矩項）與感知覺察（感知項）的「儀式設計元素分析表」脈絡裡。³ 所以學生在赴建啤實際參訪後，能以「可感」→（脈絡化→）「可述」→（經驗/體驗化→）「可憶」→（通曉化→）「可遊」去理出個人的分析覺察，且透過此分析手段，對歷史脈絡的認識更深入了，設計創意也被聚焦了。

除了上述的儀式設計分析等心理與感知等軟性資料外，中國科大團隊也對硬體空間的轉譯去提出「ASI 建物構面介面化」技術。⁴ ASI 的用途是為妥善運用投影技術，

³ This is the analytical thinking tool designed specifically for the digital design course in partnership with the Jianguo Brewery. 專為建啤專案設計之思考分析工具。

⁴ The concept of ASI (Architectural Surface as Interface) for creating architectural projections referenced in this project was proposed by Soyeon Kim and Hyunju Lee (2016) in their paper “Visitor attention and communication in information-based exhibitions”. This paper proposes the concept of ASI, which enables the exhibit space to be better utilized and more in-depth information content to be presented within the venue.

此專案所引用於創作建物投影應用的基本概念：「ASI：Architectural Surface as Interface 建物表面介面化」，是由 Soyeon Kim and Hyunju Lee (2016) 於“Visitor attention and communication in information-based exhibitions”論文中所提出。該篇論文透過技術實測，使展場空間獲得善用，使在場域空間中提供更多的深度資訊內容。



Figure 5. In April 2021, 200 students and teachers from the Department of Visual Communication Design, Taiwan's China University of Technology, visited the Jianguo Brewery to learn about the characteristics of the industrial heritage site and discuss the feasibility of involving design elements in the regeneration process. The veteran employees who have worked at the Brewery for more than 30 to 40 years and researchers from the Institute for Historical Resources Management provided guided tours to the students.

圖 5：2021 年 4 月中國科技大學視覺傳達設計系 200 位師生，一同到建國啤酒廠認識文化資產特殊性，討論未來設計參與及可行性。由在廠區工作超過三、四十年的老員工、台灣歷史資源經理學會研究員介紹說明。



Figure 6. In April 2021, students from the Department of Visual Communication Design, China University of Technology, used the Ritual Design Element Analysis Tool to conduct their analysis of the site.

圖 6：2021 年 4 月中國科技大學視覺傳達設計系「儀式設計」引導

visual material viewings before having students start their digital designs with their team members. In addition, students were asked to analyze the Brewery using the Ritual Design Element Analysis Tool and incorporate the results into their design proposals. This data and perception analysis tool allows the students to analyze a historical site after visiting it from both objective and subjective perspectives through an information transformation process of Data → (Context) → Information → (Experience) → Knowledge → (Understanding) → Wisdom. In this way, students gained a deeper understanding of the Brewery and sharpened the focus of their design.

In addition to introducing the Ritual Design Element

並以無損式擴增資訊形式在場域空間中提供更多數位展示內容。為使以「物件資訊」為內容的展件導向展覽 (object-based exhibition) ~ 建啤即是此類文資保存展覽現場，也是提供深度知識的資訊導向型展覽 (information-based exhibition)。建啤廠區很大，導覽參觀常有長距離移動，因此團隊也以「空間移動測量」完成空間紀錄與移動數據的調查，並提出「時程分析」與「內容分配」的量化設計。使相關敘事設計確實掌握具體數據與資料比重。中國科大師生團隊所完成的就是整合虛實的「phygital 教學實踐」。

建啤的故事是「活」的，且在這裡，各種參與形式都被鼓勵。

結語

文化資產保存固然重要，但如何經營管理更為關鍵。建啤會是台灣的特殊經驗，對比閒置空間之「再利用」，於當代社會「活化保存」更是須學習的課題。透過教育工程，建啤保存獲得了更多關注，也讓文資保存擴大論述空間。跨領域及數位資料庫整合，也使對於建啤歷史文化的認識更系統化。儘管轉型與保存計畫實際受阻，但研究與保存工作不曾停歇。擁有百年歷史、豐富產業史的建啤已逐步轉型為文化資產教育場域，但以民間力量推動畢竟仍有限，期望各界也能一同參與，回到文化保存初衷上，討論究竟什麼是我們於此城市期望看到的「百年啤酒廠」？

Analysis Tool for analyzing the psychological and perceptual “soft data,” the educational team of the China University of Technology also introduced the concept of ASI for interpreting the physical space. With ASI and projection technology, more digital exhibition content can be presented in the form of non-destructive augmented exhibition within the venue. ASI can also help transform object-based exhibitions, which display information about objects, into information-based exhibitions, which deliver deeper and broader information content, allowing for better use of exhibition space at historical sites such as the Brewery. The Brewery occupies a large area, and the visitor tours often involve long-distance walks. Therefore, the team from the China University of

Technology conducted “time” and “content distribution” analyses to obtain quantitative and proportional data on space and movement, which were used to rearrange the narrative content in this historic site. By integrating digital data into physical space, the teachers and students from the China University of Technology succeeded in implementing a “phygital (physical plus digital) pedagogical project”.

Conclusion

While it is vital to preserve industrial heritage, it is equally important to manage the heritage sustainably. The Brewery is a unique case in Taiwan. It has remained in operation over the years, although many others have



Figure 7. Students from the Department of Visual Communication Design, China University of Technology, displayed their works on site.

圖 7：中國科技大學視覺傳達設計系學生作品現地展示



Figure 8. In April 2021, the Brewery collaborated with Chen'en Experimental Primary School to design educational programs for students from all grade levels to explore cultural heritage and discuss issues such as urban hydrological changes, railroad construction, and urban development, guiding them to understand the relationship between industrial heritage and its surrounding environment.

圖 8：2021 年 4 月與宸恩實驗小學合作，設計中高年級、低年級課程產業文資學習課程，融合都市水文變遷、鐵路興建布設、都市發展等議題，理解產業文資與周邊環境的相互關係。



become idled. It is important for us in the contemporary society to seek ways to “reuse and preserve” this living heritage. The educational projects have sparked more interest and discussion about the preservation of the Brewery and its cultural heritage. In addition, efforts to build the Brewery’s archive in an interdisciplinary manner and establish a digital database have systematically enhanced public understanding of the Brewery’s history and culture. Although the Brewery’s transformation and preservation plans suffered setbacks in recent years, research and preservation efforts have continued unabated. The Brewery, with its century-old industrial history, has been gradually transformed into a cultural and educational venue. However, private initiatives have their inherent limitations. It is hoped that, with “cultural preservation” as the guiding principle, more stakeholders will participate in the preservation process and share their future visions for the century-old brewery.



Figure 9. In April 2021, the Brewery collaborated with Chen'en Experimental Primary School to design educational programs for students from all grade levels to explore cultural heritage and discuss issues such as urban hydrological changes, railroad construction, and urban development, guiding them to understand the relationship between industrial heritage and its surrounding environment..

圖 9：2021 年 4 月與宸恩實驗小學合作，設計中高年級、低年級課程產業文資學習課程，融合都市水文變遷、鐵路興建布設、都市發展等議題，理解產業文資與周邊環境的相互關係。

A Brief History of the Tin Mining Industry in Malaysia

馬來西亞錫礦業簡史

Teoh Chee Keong (Assistant Professor from the School of Architecture and Built Environment, UCSI University, Malaysia)

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The earliest history of tin mining in the Malay Peninsula remains to be determined. To date, the earliest known record of tin mining can be found in the Brief Account of the Island Natives (1349), a book written by Wang Dayuan, a Yuan Dynasty merchant. He noted in the book that several small kingdoms in the Malay Peninsula, such as Pahang, Kedah, and Kelantan, had been producing pure tin, and that the state of Trengganu was using tin ingots for trading goods. By the Ming Dynasty, Gong Zhen, who served as General Zheng He's interpreter during the Ming treasure voyages, described in his book The Annals of Foreign Nations in the Western Ocean (1434) how tin was mined in Malacca and how the local inhabitants smelted tin into ingots and used them as currency.

In 1511, shortly after the Portuguese occupied Malacca, tin was exported to Europe and used mainly for producing bronze ware. In 1641, the Dutch occupied Malacca and signed a treaty with Sultan Muzafar Syah for tin mining franchises, which allowed the Dutch to set up trading posts in the Perak River basin and Kuala Selangor. The Dutch, drawing on their experience of developing Bangka Island in Indonesia, based themselves in Malacca and encouraged Chinese people to enter the inland areas to cultivate new land. In addition, they appointed a Chinese representative as the "Captain Chinese," namely the leader of the Chinese people, and granted him basic arbitration powers to govern the area and settle local disputes.

By the end of the Dutch colonial period, tin mining had been extended to North Perak. In 1778, the first two shipments of tin arrived in Malacca from Kinta and Sungkai. The tin was examined and declared to be of high quality. In the meantime, the Chinese miners began to introduce new mining techniques and hierarchical labor division methods into the mining industry. To



Figure 1. Map of Tin Deposits in the Malay Peninsula (Photo credit: Penzer, NM 1921, The tin resources of the British Empire, London: W. Rider and son)

圖 1：馬來半島錫蘊藏地分佈圖（資料來源：Penzer, NM 1921, The tin resources of the British Empire, London: W. Rider and son）

關於馬來半島錫開採的最早歷史仍有待考證，目前已知元代商人汪大淵所著《島夷誌略》（1349年）當中已有記載：馬來半島的幾個小王國如彭亨（Pahang）、吉打（Kedah）、吉蘭丹（Kelantan）等皆有出產花錫，登加樓（Trengganu）已有使用貨用斗錫。到了明代，鄭和下西洋時期之翻譯員鞏珍在他的《西洋番國誌》（1434）裡提及馬六甲和當地錫礦開採的情況，以及當地居民將錫苗煉製成塊，當成貨幣使用。

1511年，葡萄牙佔領馬六甲後不久，便陸續將錫輸往歐洲，主要做為生產青銅器具。荷蘭人在1641年佔領馬六甲之後，與蘇丹慕查法沙（Sultan Muzafar Syah）簽訂錫專利條約，允許荷蘭人在霹靂河（Perak River）流域地區及瓜拉雪蘭莪（Kuala Selangor）地區設立貿易站。荷蘭人參考印尼邦加（Bangka）島的開發經驗，以馬六甲做為

maximize profits, the miners carried out large-scale mining activities around the clock.

As European imperialism expanded, Britain began to extend its colonial rule from Central Asia to Southeast Asia in the 17th century, following the footsteps of Portugal and the Netherlands. In 1786, Britain took over Penang from the Kedah Kingdom. As a result, Penang was opened to foreign trade, aiming to attract merchants from Europe and Asia to set up trading posts there. In a short period of time, Britain turned Penang into the most important commercial port in the Straits of Malacca. Due to its rising importance, Penang eventually replaced the Dutch Malacca as the leading port in the region.

By the middle of the nineteenth century, more European countries began to exploit natural resources in their colonies under the influence of the Industrial Revolution. The rich tin deposits in the Malay Peninsula caught the attention of the European investors. Britain, being central to the Industrial Revolution development, had the technical advantage of tin excavation. At that time, however, the British government was restricted by the Non-Intervention Policy and could not freely venture into the Malay Peninsula. Therefore, it encouraged European merchants, Malay leaders, and Chinese merchants to form syndicates for mining tin in the Malay Peninsula, especially in the northern part of Perak, with Penang as their base. Tin smelting plants were set up on the opposite side of the Penang Strait to cast tin into bricks, which were then shipped to Europe.



Figure 2. The tin mine at Taiping, Perak, circa 1910 (Photo credit: Leiden University Libraries Digital Collections)

圖 2：霹靂太平錫礦場 約攝於 1910 年（資料來源：荷蘭萊頓大學數位典藏）

據點，鼓勵華人進入內陸地區開發，並委任一名華人領袖擔任華人甲必丹（Captain Chinese），擁有基本的仲裁權力，以處理地方上的管理及大小糾紛。

到了荷蘭殖民後期，錫礦開採活動已經擴展到北霹靂境內，在 1778 年，首兩批錫產由近打（Kinta）及宋溪（Sungkai）送抵馬六甲，經檢驗後，被認定屬於高品質錫產。在此時，華人礦工開始引進新的開採工法，並以層級分工的方式，以經濟利益為優先，以全時的方式進行大規模開採。

隨著歐洲帝國主義擴張，英國隨著葡荷的步伐，在十七世紀開始從中亞擴展到東南亞。1786 年從吉打王國接手檳城，採取開放貿易的方式，吸引歐洲及亞洲各地的商人前來設置商棧，在短時間內將檳城打造成馬六甲海峽最主要的商港，最終取代了荷屬馬六甲的地位。

到了十九世紀中，由於受到工業革命的影響，歐洲各國紛紛在其殖民地開發自然資源。馬來半島蘊藏豐富的錫礦，遂開始引起歐洲投資者的注意，尤其英國為工業革命的中心點，自然佔有錫礦開發的優勢。由於當時英國仍受不干預政策（Non-intervention Policy）的限制，官方不能冒然挺進馬來半島地區，因此鼓勵歐洲商人與馬來領袖，華人商人等結合成集團，以檳城為據點，往馬來半島，尤其霹靂北部開始進行錫礦開挖，並在檳榔嶼對岸設立溶錫廠，將錫苗鑄成錫磚運往歐洲。

1840 年代，北霹靂拉律（Larut，今太平（Taiping））地區發現錫礦，吸引了檳城的投資者前來，引發了第一波開採活動。到了 1880 年代，錫礦開採更深入到內陸地區，其中以近打河流域的錫礦含量更為豐富。來自不同地區的



Figure 3. The dredge on Pengkalen, Selangor (Photo credit: Leiden University Libraries Digital Collections)

圖 3：雪蘭莪 Pengkalen 鐵船（資料來源：荷蘭萊頓大學數位典藏）

In the 1840s, tin was discovered in Larut (now Taiping) in North Perak. Investors in Penang flocked to the area, which kicked off the first wave of mining operations there. In the 1880s, tin mining extended further into the interior regions, with the Kinta River basin containing the greatest deposit of tin ore. Investors from near and far began to establish tin mining companies and fight for tin mining rights from the local rulers. The huge economic interest of the tin mines led to a scramble for power among the Malay rulers, with Chinese mine owners joining different factions to jockey for position. Eventually, syndicates of Chinese and Malay rulers were formed. In the 1860s, riots broke out and the British government, taking advantage of the tumultuous situation, began to recruit representatives from the syndicates. The British offered to endorse the legitimacy claims of the Malay rulers, who in return agreed to accept the British appointment of resident officials, whose duty was to assist and coordinate matters relating to land, taxation, trade, and mining. This was the beginning of the indirect-rule regime of the British colonial era.

In like manner, the British presence spread to Perak, Selangor, Pahang, and Negeri Sembilan within a few years. In 1895, the British incorporated these four kingdoms into the “Federated Malay States” for more efficient administration. The four “kingdoms” were officially renamed “states” as a result. Britain chose these four states as the starting point of its resource exploitation because these regions contained rich deposits of tin. The establishment of the Federated States was a strategic and political breakthrough for Britain in terms of tin mining development.

From then on, Britain continued to bring in investors from Europe, who established companies of various sizes in Malaysia. These companies were involved in everything from tin mining, tin smelting, the introduction of machinery from Europe, power generation, water supply, transportation, etc., and accelerated the development of the inland towns of the Malay Peninsula. To date, some of the companies are still in operation, 130 years after their initial establishment.

The development of tin mining in the Malay Peninsula has led to the emergence of numerous towns of various



Figure 4. The tin mine at Tronoh, Perak (Photo credit: Leiden University Libraries Digital Collections)

圖 4：霹靂境內端洛（Tronoh）錫礦（資料來源：荷蘭萊頓大學數位典藏）

投資者開始設立錫礦公司，並向當地統治者爭取錫礦開採權。由於龐大的錫礦利益造成馬來統治者的權力爭奪，而華人礦主們也分別屬於不同派系，最終形成由華人及馬來統治者組成的利益集團，在 1860 年代爆發動亂，英國政府藉此招攬集團代表，提出由英國政府承認馬來統治者的地位，而統治者必須接受英國委派駐地官員，輔助並協調土地、稅收、貿易及礦業等事項，開啟了所謂間接殖民的英國參政時代。

英國人使用同樣的手法，在幾年的時間內陸續進駐霹靂（Perak）、雪蘭莪（Selangor）、彭亨（Pahang）及森美蘭（Negeri Sembilan）。到了 1895 年，英國將此四個王國結合成為馬來聯邦（Federated Malay States），以便進行更有效的管理。自此，四個邦國改稱為州，英國選擇以這四州為起始，主要乃因為這些地區的土地蘊藏大量的錫，在錫礦業開發方面，馬來聯邦的成立對英國而言是非常重大的政治策略突破。

自此開始，英國積極從歐洲引進投資者，成立大小不一的公司，包辦了錫礦開採、溶錫、引進歐洲生產的機械、發電、供水、運輸等等，加速馬來半島內陸城鎮的開發。到今天，一些尚在運作的公司，已有超過 130 年的歷史。

馬來半島錫礦開發，造就了許多大小市鎮，包括馬來西亞首都吉隆坡、雪蘭莪州境內的加影（Kajang）、安邦（Ampang）、萬宜（Bangi），霹靂州首府怡保（Ipoh）、其他市鎮如太平、金寶（Kampar）、華都牙也（Batu Gajah）、務邊（Gopeng），彭亨州的林明（Sungai Lembing）、森美蘭州首府芙蓉（Seremban）、蘆骨

sizes, including Kuala Lumpur, the capital of Malaysia; Ipoh, the capital of Perak; and Seremban, the capital of Negeri Sembilan. Other towns that emerged with the tin mining industry also include Kajang, Ampang, and Bangi in Selangor; Taiping, Kampar, Batu Gajah, and Gopeng in Perak; Sungai Lembing in Pahang; and Lukut in Negeri Sembilan. The architectural heritage and cultural landscapes of these towns are inextricably linked to the exploitation of tin mines.

Malaysia has reaped substantial profits from tin mining, which, at one time, made Malaysia one of the countries with the highest per capita income in Asia. Tin mining activities also left behind many mine craters. These remaining pits, after being filled with groundwater and rainwater over a long period of time, turned into artificial lakes of various sizes and became a common feature of the cultural landscapes in Malaysia's tin mining towns. Meanwhile, tin mining heritage has been preserved in some mining regions. For example, Perak and Selangor have each preserved two tin dredges, while an underground tin mining museum has been established in Sungai Lembing. In addition, the tin mining industry has left behind architectural legacies in the mining towns, including the guildhalls founded by the miners and investors, and miners' amenities such as the public libraries and theaters. They constitute an integral part of the cultural landscape in Malaysia's contemporary cultural heritage towns.

(Lukut) 等等。這些市鎮的建築遺產、人文地景等等與錫礦有著不可分割的關係。

馬來西亞各地的錫礦開採獲得豐厚的利益，使得馬來西亞曾經一度為亞洲人均收入最高的國家之一，錫礦開發所遺留下來的礦坑，在經過長時間的地下水及雨水填充之後，成為許多大小不一的人工湖泊，為各個錫礦市鎮共有的文化地景。一些地區仍然保留著錫礦工業遺產，例如霹靂州及雪蘭莪州各別保留了兩艘鐵船，林明則有地下錫礦博物館。若加上這些城鎮的建築遺產，由礦工及投資者成立的會館、公益設施如民眾圖書館、劇院等等，是構成馬來西亞近代文化遺產城鎮文化景觀的最主要元素。



Figure 5. The giant mixer in the tin processing plant at Tambun, near Ipoh. (Photo credit: Leiden University Libraries Digital Collections)

圖 5：怡保近郊打捫（Tambun）的錫苗處理工廠的巨型攪拌機。（資料來源：荷蘭萊頓大學數位典藏）

Taiwan's Policies on Industrial Heritage Preservation

臺灣產業文化資產政策保存之路

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Figure 1. The Tainan Shan-Shang Garden and Old Waterworks Museum, formerly known as the Old Tainan Watercourse, was open to the public in 2019. (Photo credit: Bo-Zhi Chen)

圖 1：2019 年開放的臺南山上花園水道博物館—原臺南水道廠區
(資料來源：陳柏志)

Industrial heritage preservation in Taiwan has been carried out in accordance with the Cultural Heritage Preservation Act, which was enacted in 1982, and a series of preservation policies developed thereafter. Early conservation efforts included campaigns to preserve the Zhuzimen Hydro Plant (Chusaimen Power Plant) in 1993 and the Taiwan Province Monopoly Bureau Taipei Wine Factory in 1997. Launched by the decommissioned plants' entry-level employees or concerned citizens and assisted by experts and scholars, these campaigns aimed to enhance the government's awareness of heritage preservation, contributing to the implementation of heritage preservation policies in Taiwan.

In 2002, the Council for Cultural Affairs established the Industrial Heritage Survey Team. At that time, many cultural assets were identified as no longer operationally viable as the government pushed for the privatization of state-owned enterprises. The Survey Team's systematic inventory of these cultural heritage signified a more



Figure 2. Group photo taken after the 15th TICCIH Congress (TICCIH 2012) (Photo credit: Bo-Zhi Chen)

圖 2：國際工業遺產保存委員會第十五屆會員大會暨學術研討會 (TICCIH 2012) 會後大合照 (資料來源：陳柏志)

臺灣的產業文化資產保存工作，是依循 1982 年制訂的「文化資產保存法」為基礎，所推動的一系列保存政策。在此之前，先後有「竹仔門電廠」(1993 年) 及「臺灣省菸酒公賣局臺北酒廠」(1997 年) 保存事件的發生。這些事件是由基層員工或民間人士，進行保存行動與呼籲，加上專家學者的協助，喚起政府部門的重視，進而推動一系列保存政策。

2002 年由文化建設委員會籌組「產業文化資產調查小組」，針對公營事業民營化改革過程中，釋出大量不具備經營管理效益的資產，加以有計畫的清查所屬的文化資產，可視為政府部門轉為積極進行產業文化資產保存工作的重要事件。在此之前，則以單點、單棟的進行產業文化資產的指定與登錄作業。

在「產業文化資產清查計畫」陸續產出成果時，便與「閒置空間再利用」政策結合，將鐵路車站附近的廢棄舊倉庫，再利用為「藝術村」，而後陸續將糖廠、礦廠、水源地、林場、酒廠、菸廠與鹽場等，再利用為文創園區、藝術園區、博物園區、博物館等文化場域。之後，陸續推動跨年度的產業文化資產調查與整合保存計畫。

proactive approach and marked an important milestone in Taiwan's heritage preservation. Prior to this, the government tended to designate and register industrial assets on an individual, case-by-case basis.

As the Industrial Heritage Inventory Projects continued to produce results, they were further integrated with the government's policy of "revitalizing unused heritage spaces." Abandoned warehouses near the railroad stations were reused as art villages, while sugar refineries, mining sites, headwater sites, forest land, breweries, tobacco factories, and salt fields were revitalized as cultural and creative parks, art parks, museums, and other cultural venues. Following that, the government promoted various multi-year industrial heritage surveys and integrated conservation projects.

Since 2008, Taiwan's heritage practitioners have been participating in the International Committee for the Conservation of the Industrial Heritage (TICCIH). In 2012, the 15th TICCIH Congress was held in Taiwan and the Taipei Declaration was signed to underscore the characteristics of the Asian industrial heritage. The TICCIH Congress 2012 was a great success and showcased Taiwan's contribution to the preservation of industrial heritage.

As can be seen from the table, the Taiwan government's initial approach was to first inventory and investigate the island's cultural heritage, then carry out restoration projects targeting individual buildings or sites. However, over the years, the projects began to acknowledge the value of adaptive reuse of the heritage. In recent years, Taiwan has adopted a more holistic approach to preserving and reusing cultural heritage by transforming them into "cultural parks."

In the future, Taiwan will continue to take an interdisciplinary and integrated approach that highlights the value of holistic "heritage systems" in order to connect individual heritage sites and buildings and enhance the preservation of industrial heritage sites located in remote areas.



Figure 3. Results Report of the Industrial Heritage Inventory Project—Phase III: Designated Government Offices Professional Counseling Project. (Participating government agencies: Taiwan Agricultural Research Institute, Council of Agriculture, Executive Yuan; Tea Research and Extension Station, Council of Agriculture, Executive Yuan; Bureau of Mines, Ministry of Economic Affairs)

圖 3：文化性資產清查計畫 - 第三階段指定單位專業輔導計畫—行政院農業委員會農業試驗所、茶葉改良場、經濟部礦務局成果報告書

自 2008 年開始，我國與國際工業遺產保存委員會 (TICCIH) 進行交流，2012 年更在臺灣舉辦第十五屆會員大會暨學術研討會，會後更簽署「臺北宣言」闡述亞洲地區的產業文化資產之特性。TICCIH 大會的成功舉辦，正是推廣我國在產業文化資產保存工作上的成果。

因此，我國產業文化資產保存觀念，是透過清查或調查後進行修復，再由單棟或單點式，進階到再利用式的保存。近來以「文化園區型」的再利用方式，進行整體性保存。

未來，對於單點、單棟與偏遠地區的產業文化資產，將以重視價值體系與跨域整合方式進行保存工作，成為我國持續產業文化資產的保存工作。

List of Important Industrial Heritage Preservation Projects and Results in Taiwan over the Years

| Time | Project | Important Results |
|--------------|---|--|
| 1985~present | Cultural Heritage Designation and Registration | About 625 tangible industrial and cultural assets were registered. |
| 2000~present | Local Cultural Museums | At least 47 industrial and cultural museums were established. |
| 2000~2006 | Industrial Heritage Inventory Projects | 47 inventory projects were completed in three phases. |
| 2002~present | Cultural and Creative Industry Development Projects | Five major cultural and creative parks were established and opened to the public. |
| 2002~present | Taiwan's Potential World Heritage Sites Project | Among the 18 potential sites, eight of them were industrial heritage sites. |
| 2006~2009 | Industrial Heritage Regeneration Project | Eight industrial heritage regeneration sites were established under the government's guidance. |
| 2013~present | Taiwan's Industrial Heritage Value System Survey Project | Industrial heritage value system surveys on sugar, tobacco, and tea industries were completed. |
| 2016~present | Regeneration of Historic Sites—Taiwan Cultural Route | Eight projects themed on industrial heritage were completed. |
| 2019~present | Taiwan's Route of Industrial Heritage— Interdisciplinary Connection and Promotion Project | Asian Network of Industrial Heritage (ANIH) was established to promote international exchange and collaboration. |

Source: compiled by the researcher

歷年重要計畫方案與成果表

| 時間 | 計畫名稱 | 重要成果 |
|-------------|------------------|--------------------------|
| 1985年~至今 | 文化資產指定與登錄作業 | 有形產業文化資產，約有625筆。 |
| 2000年~至今 | 地方文化館計畫 | 至少有47間產業文化館。 |
| 2002年~2006年 | 產業文化資產清查計畫 | 陸續推動三個階段，完成47項清查計畫。 |
| 2002年~至今 | 文創產業發展計畫 | 五大文化創意產業園區之整建及營運。 |
| 2002年~至今 | 臺灣世界遺產潛力點計畫 | 18處潛力點中，有8處以產業文化資產名義為主體。 |
| 2006年~2009年 | 產業文化資產再生事業計畫 | 輔導建立8個產業文化資產再生點。 |
| 2013年~至今 | 臺灣產業文化資產價值體系調查計畫 | 完成糖、菸、茶等產業文化資產價值體系調查工作。 |
| 2016年~至今 | 再造歷史現場計畫—臺灣文化路徑 | 完成8個以產業文化資產為主題的計畫。 |
| 2019年~至今 | 產業文化路徑跨域連結及推廣計畫 | 架設「亞洲產業文化資產平台」進行國際交流。 |

資料來源：本研究整理

Public Participation in Conservation and Development of the Makkasan Factory District

「公眾參與」與馬卡森廠區的保護與發展

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The Makkasan factory, Bangkok, Thailand, is a place for the repair of locomotives and every kinds of vehicle of the State Railway of Thailand. The construction of the factory started in 1907 and an opening ceremony was in June, 1910. After that, the area of the factory was expanded and more buildings were built as replacement of the old ones, which were made from galvanized iron. During the World War 2, it was a target of airstrike for 4 times. This caused a lot of damage to the buildings and structures of the factory. After the war, the renovation and repair of the factory buildings, tools and mechanical equipment within the factory was back to the point it can functionally operate. Nowadays, the Makkasan factory is the State Railway of Thailand's largest and most important repair of locomotives. Apart from the Makkasan factory, there was the Makkasan railway station built in 1907, an establishment of the Burachat Chaiyakorn Hospital in 1950 to support medical benefits for the train officers and their families, and the construction of the Makkasan welfare housing community in 1954 as residential benefits for the officers and workers who were affiliated with the Makkasan factory. After that, the State Railway of Thailand had renovated and extended the capacity of the Burachat Chaiyakorn Hospital to supply the demand of the increased patients and built more residential buildings within the Makkasan welfare housing community to the point it can support 651 families to this day.

The first development plan for the Makkasan factory district was initiated in 2004 by the Thai government. The plan consisted of the construction of elevated electric train system that link the Suvarnabhumi international airport and the district as well as the city center. The district will be developed for commercial activities mostly. At present, the elevated electric train system is now in operation and the district is still in the process of development. Later in 2013, the new development plan for the Makkasan factory district as Bangkok's Gateway and the center of transportation was



Figure 1. Aerial photograph of the Makkasan factory district
圖 1：馬卡森廠區空拍圖

馬卡森維修機廠位於泰國曼谷，是泰國國家鐵路局維修機車和各種鐵道車輛的工廠。該廠始建於 1907 年，於 1910 年 6 月正式啟用，此後廠區不斷擴建，並以新建物取代以鍍鋅鐵皮建成的舊有建物。二戰期間，該廠曾四度成為空襲目標，致使機廠的建築物和構造物嚴重受損。戰後，馬卡森維修機廠的建築物、工具及機械設備經過翻新整修，恢復了正常運作，如今更是泰國國家鐵路局最大且最重要的機車維修廠。馬卡森廠區除了包含一座維修機廠，還有建於 1907 年的馬卡森火車站、建於 1950 年以提供車站職員及其家屬醫療福利的 Burachat Chaiyakorn 醫院、以及建於 1954 年以提供馬卡森機廠職員及工人住宅福利的馬卡森福利住房社區。此後，泰國國家鐵路局對 Burachat Chaiyakorn 醫院進行了改造和擴建，以滿足更多患者需求，並在馬卡森福利住房社區興建更多住宅樓，至今已能容納 651 個家庭。

2004 年，泰國政府啟動馬卡森廠區的第一個發展計畫，計畫內容包括建設高架電力列車系統以連接該廠區與蘇凡納布國際機場及市中心，主要希望將其打造成商業活動中心。如今高架電力列車系統已開始運作，廠區發展則

released by the Thai government. The plan consisted of the construction of retail mall, convention hall, hotel, and office. However, the plan was opposed by the public. The oppositions set up a Facebook page named “Rao yak hai Makkasan pen suan satharana lae pipitthaphan (เราอยากให้มีก๊ะสัน เป็นสวนสาธารณะและพิพิธภัณฑ์)” in Thai or “We want the Makkasan as public park and museum” in English to call for the government to develop the district into public space that would be more utilized to the general public. This opposition caused the government to postpone the project. Until now, there still no progress in participation agreement.

After that, at the beginning of 2015, there was news that the government will continue with the commercializing project once again. As a result, the public came together and enhanced the level of the protest to a campaign called “The Makkasan Network”, which is a coalition of national level specialists of many fields including many professional associations and public sector organizations to brainstorm for the best solution for the utilization of the Makkasan factory district. I, myself, is one of the participants of the Makkasan Network who always participates in the movement of the campaign through many activities, for example: giving lectures, participating as a speaker of panel discussion, holding exhibition, writing articles, and giving interview to the media.

Later, myself, as head of the project received funding from the Association of Siamese Architects under Royal Patronage to work on a research entitled “Survey and Inventory of Valuable Buildings Worthy of Preservation in the Makkasan factory district”. The research duration is 2 months starting from 1st June 2017 to 31st July 2017 under the following objectives:

1. To collect data upon architectural heritage and assess the value of buildings and structures within the area of the Makkasan factory district.
2. To handover the data to the State Railway of Thailand and Thailand Ministry of Finance as fundamental data that policy makers can take into account when making decision and future plans for area development to make the development conform to the socio-economical, historical, cultural, and

仍在繼續。2013年，泰國政府發布馬卡森廠區的新發展計畫，計畫將廠區打造成曼谷門戶和交通中心，計畫內容包括建設零售商場、會議廳、飯店和辦公室。但該計畫遭到民眾反對，反對者成立了一個名為「เราอยากให้มีก๊ะสัน เป็นสวนสาธารณะและพิพิธภัณฑ์」（泰文）的臉書頁面，意思是「推動馬卡森成為公園和博物館」（We want the Makkasan as public park and museum），藉此呼籲政府將廠區轉型為公共空間，讓更多土地供人民使用。由於出現反對聲浪，政府推遲發展計畫，直至今日，利害關係團體尚未達成參與協議。

2015年初，有消息稱政府打算再次推動廠區商業化，群眾因而集結，組成「馬卡森網絡」（The Makkasan Network）以強化抗議力道。「馬卡森網絡」是多個領域的國際專家組成的聯盟，包含許多專業協會和公共部門組織，希望通過集思廣益發想出馬卡森廠區的最佳利用方案，我個人也是「馬卡森網絡」的一員，一直以來通過演講、作為論壇講者、舉辦展覽、撰寫文章、接受媒體採訪等諸多方式參與其中。

後來，我主持的研究項目「調查與盤點：馬卡森廠區值得保存的珍貴建築」（Survey and Inventory of Valuable Buildings Worthy of Preservation in the Makkasan factory district）獲得泰國暹羅建築師協會（The Association of Siamese Architects under Royal Patronage）贊助，研究期限為2個月（2017年6月1日至2017年7月31日），目標如下：

1. 搜集建築遺產的相關資料，評估馬卡森廠區內建築物和構造物的價值。
2. 向泰國國家鐵路局和泰國財政部提交資料，作為政策制訂者在決策或制訂該區未來發展計畫時的重要



Figure 2. The Makkasan Network

圖 2：「馬卡森網絡」

environmental context of the district for the highest utilization of the area.

3. To handover the data for the government to use as fundamental information for the founding of railway factory museum and for the process of decision making upon, which form of museum shall be found.
4. To set a pattern for the making of database of architectural heritage for state agency that is responsible for preservation and conservation of valuable local buildings and structures that are not yet to be value-assessed or found.
5. To encourage the civil-state cooperation where the public civilians, academic think tanks, and professional associations cooperate with the state to collect data upon history and architectural heritage, which is the core of socio-economic and industrial development. This research believes that sustainable development solely derives from firm preservation of national identity.

This project, if considered according to Preservation Planning Process, is still at the first step of the whole process, which is the identification and documentation. Then, the next is to proceed is with treatments to preserve its values such as authenticity and integrity. After that, the 3rd process is implementation, which is the process of planning making, legislation, budget setting, and operation. However, the guideline for preservation and development of the valuable buildings and structures within Makkasan factory district can merely be implemented by the cooperation of all responsible parties from the beginning of the project.

After finishing the research, I handed over the research and data to the Association of Siamese Architects under Royal Patronage, Treasury Department, the State Railway of Thailand, and the Makkasan Network to be used as fundamental data to be taking into account upon decision making and policy making for the guideline of the preservation and development in the future. Moreover, I have published the data about the project through many activities such as giving lecture, panel discussion, exhibition, writing article and giving interview. Later in April 2021, the State Railway of Thailand had published 1,000 copies of the book to

參酌參考，以期該區發展能更符合其社會經濟、歷史、文化和環境脈絡，達成最佳利用。

3. 向泰國政府提交資料，作為興建鐵路機廠博物館及決定博物館形式時的重要參考。
4. 為保存和保護尚未被評估或發現、但具價值的當地建築物和構造物，需要為專責之國家機構打造建築遺產資料庫的建立模式。
5. 鼓勵民間——即群眾、學術智能團、專業協會——與國家攜手合作，搜集歷史資料和建築遺產資料。這些資料是社會經濟和工業發展的核心。本研究認為要實現永續發展，就必須堅定地保護國家認同。

在「遺產保存規劃流程」的框架下，此研究的「識別與紀錄」是整個流程的第一步，第二步是「遺產處理」，以保存遺產的價值，如真實性和完整性，第三步則是「執行」，即規劃、立法、制定預算和運作的過程。唯有於計畫開展之初就讓所有責任方通力合作，廠區內值得保存的建築物和構造物才可能依計畫準則進行保存和發展。

研究完成後，我將研究和資料提交給泰國暹羅建築師協會、泰國財政部、泰國國家鐵路局和「馬卡森網絡」，作為決策者或政策制定者未來在規劃該區保存與發展方針之重要參考。此外，我也通過各種活動，如演講、論壇、展覽、撰寫文章和接受採訪等方式去發表研究資料。2021年4月，泰國國家鐵路局出版1000冊紀念馬卡森維修機廠111週年相關書籍，書中加入我在2017年研究中搜集到的完整資料，包括：1) 馬卡森廠區的歷史、2) 馬卡森維修機廠的建築、3) 馬卡森廠區值得保護的樹木種類、4) 馬卡森維修機廠工人的回憶錄。

其後，「馬卡森網絡」與泰國國家鐵路局、泰國鐵道基金會等單位聯手，在馬卡森廠區內修復並建造建築物和構造物，包括：1) 修復 Luang Phor Nak Prok 寺、2) 為具有歷史意義的火車和機車建造車庫、3) 修復建於1922年的材料倉庫建築、4) 修復禮堂大廳建築。

未來，我計畫與「馬卡森網絡」持續合作，敦促國家與民眾、學術和民間單位一同合作制定馬卡森廠區的保存和發展計畫，調整其政策方向使之更貼近地方需求，同時呼籲國家和政策制定者採用合乎環境影響評估 (EIA)、健康影響評估 (HIA) 和遺產影響評估 (HIA) 的發展計畫。

commemorate 111 years of Makkasan factory in which they adapted and added the full version data that had been collected through the research of 2017, which includes data about: 1) the history of Makkasan factory district 2) the architecture of Makkasan factory 3) the kinds of trees that are worthy preservation within the Makkasan factory district, and 4) the memoirs of the Makkasan factory workers.

Later, the cooperation between the Makkasan Network, the State Railway of Thailand, and Thai Railway Foundation results in rehabilitation and construction of buildings and structures within the Makkasan factory district, namely: 1) rehabilitation of Luang Phor Nak Prok temple 2) construction of train garage for historical trains and locomotives 3) rehabilitation of the 1922 materials storage building and 4) rehabilitation of auditorium hall building.

For future plans, I intend to work in cooperation with the Makkasan Network to urge the making of the conservation and development plan for the Makkasan factory district through cooperation between state, public, academic and civic sector that will lead to change in the direction of the policy, which will be more local oriented. This urges that the state and policy makers should consider development plans that follow Environmental Impact Assessment (EIA), Health Impact Assessment (HIA) and Heritage Impact Assessment (HIA) as well.



Figure3-8. Some of Parinya Chukaew's activities
圖 3-8：本文作者 Parinya Chukaew 參與之活動

The Besshi Copper Mines in Niihama: A Mining Legacy That Supported the Rise of the Sumitomo Group, a Japanese Zaibatsu

支撐日本財閥的天空之城 新居濱「別子銅山」產業遺產群

Yi-Chun Liao (Staff member of the Teikyo University Media Library Center)

帝京大學 Media Library Center 職員 廖怡鈞

The Besshi Copper Mines in Niihama City, Ehime Prefecture, Japan, which contributed greatly to the modernization of Japan over a period of 283 years, is the driving force behind the rise of the Sumitomo Group, one of Japan's four major zaibatsu (business conglomerates). Following the closure of the Mines in 1973, the forests have regained tranquility and greenery, and the remaining industrial relics have been transformed into tourism resources, becoming the key to the success of the city's future development.

Toyoda City in Aichi Prefecture and Hitachi City in Ibaraki Prefecture are among the many industrial cities in Japan that maintain close ties with large corporations, and Niihama City, located in Ehime Prefecture, Shikoku, Japan, is no exception. In October 2019, I had an opportunity to visit the Besshi Copper Mines in Niihama for the first time as an interpreter for the Institute for Historical Resources Management.

Niihama has been known for its copper resources from the Besshi Copper Mines since the Edo period. In 1691, the Sumitomo Group applied to the Shogunate for the mining rights and thereafter began its 283-year-long mining history. Over the years, the mining industry had generated considerable income for the Sumitomo Group, and at its peak, the mining village of Besshi had a population of nearly 5,000.

After the Mines closed in 1973 and the miners left Besshi, the local schools, staff dormitories and other mining facilities, as well as industrial relics such as pits, storage depots, and mining railroads, were left quietly in the mountains. It was not until 1991, when the mining theme park Minetopia Besshi, known as the "Machu Picchu of the Orient", opened, that the mining ruins hidden in the mountains were renovated



Figure 1. Besshi Copper Mine Memorial Museum's semi-underground building design resembles the underground mining tunnels. The interior is divided into five exhibition areas: Izumiya (Sumitomo's history), History, Geology (ore deposit), Daily Life and Customs, and Mining Techniques.

圖 1：別子銅山紀念館為半地下式建築，模擬過往礦山坑道意象。館內共分為泉屋（住友）、歷史、地質・礦床、生活習俗與技術等五大展區。

概要

作為日本四大財閥之一住友集團的起家地，日本愛媛縣新居濱市「別子銅山」283年間為日本的近代化付出莫大貢獻。1973年封山後，山林恢復寂靜與綠意，存留下的產業文資轉型為觀光資源，考驗著這座城市未來的發展走向。

舉凡愛知縣豐田市、茨城縣日立市等，日本國內散見不少與大型企業維繫密切關係的工業城市，位於日本四國愛媛縣的新居濱市亦是其一。2019年10月由於擔任台灣歷史資源經理學會的日本參訪行程隨行口譯，而有機會初次造訪新居濱的別子銅山。

新居濱在江戶時期因「別子銅山」坐擁銅礦資源而受到注目。1691年住友集團向幕府申請採礦權，283年間，

and transformed into tourism resources, reintroducing Besshi's mining history to the world.

The Sumitomo Group had operated the Besshi Copper Mines for nearly 300 years, building a complementary and inseparable relationship with Niihama, the city where the Mines are located. Saihei Hirose, the first director-general of Sumitomo, took the lead in introducing modern copper refining technology into Japan with his outstanding management skills and vision, enabling the corporation to lay down a solid development foundation with revenues from copper mines. Teigou Iba, the second director-general, invested a significant amount of manpower and funds to develop environmentally friendly mining processes, when the company faced a credibility crisis caused by pollution from sulfur dioxide generated in the smelting process. This move not only brought about Japan's first successful example of reducing mining pollution but also raised awareness of forest conservation, which later led to the establishment of "Sumitomo Forestry Co., Ltd." Kageji Washio, one of the previous managers of the Besshi Mine, introduced the idea of urban planning to the city of Niihama in the 1930s. By refining the street plan and building a wide range of public facilities and chemical and machinery factories for the mining industry, he successfully transformed Niihama from a small mining town into a sizable industrial city.

One of the missions of the Sumitomo Group is "Benefit for self and others, private and public interests are one and the same." This philosophy, which emphasizes the importance of Sumitomo being a corporation that benefits the nation and the society rather than simply pursuing its own interests, was conceived from the long years of operating the Mines. If you have the opportunity to visit the Besshi Copper Mine Memorial Museum at the foot of the mountain, you will be able to learn more about Sumitomo Group's shared prosperity with Niihama and the Mines.

After mines are decommissioned, the conservation and reuse of the historical architecture and the preservation of shared memories are issues of concern to those seeking to preserve the mining heritage. Now that the Sumitomo Group has shifted its business focus to Osaka, the regeneration of the Niihama City now lies in the hands of the city government and its residents.

別子當地全盛時期一度發展為近 5000 人的村落，礦業也為住友集團長年帶來豐厚的收益。

1973 年封山後，礦山從業人員們撤離別子，當地的學校與員工宿舍等民生設施以及礦坑、貯礦庫與礦山鐵道等產業遺跡便無聲地沈睡於山林之間。1991 年，礦山主題公園「マイントピア別子 (Minetopia 別子)」開幕、整備藏身山間的礦業遺跡後，這段歷史才以「東洋的馬丘比丘」之名，作為觀光資源重現在世人面前。

翻開住友集團經營別子銅山近 300 年間的歷史篇章，著實可以感受到企業與城市兩者相輔相成、密不可分的关系。初代總理事廣瀨宰平 (Saihei Hirose) 以其優異的經營手腕與遠見，首度將近代煉銅技術導入國內，住友才得以倚賴銅礦收益穩固企業發展基礎；第二代總理事伊庭貞剛 (Teigou Iba) 因冶煉過程中產生的二氧化硫污染面臨失信危機，在其決斷下投入龐大的人力與研究資金後，成為日本首度成功根絕公害污染的案例，並延伸出山林保護意識，促成日後「住友林業」的誕生；別子礦山所負責人之一鷲尾勘解治 (Kageji Washio) 在 1930 年代將都市計畫思想導入新居濱市內，整備街道規劃、廣設民生設施外，亦設置銅山相關的化工、機械產業工廠據點於此，將新居濱由「礦山小鎮」改造為「工業城市」。

住友集團的經營理念之一「自利利他公私一如」，意指比起追求個人私利，住友應成為有益於國家、社會的企業。可以說正是從礦山經營中，孕育出了這樣的企業理念。若有機會造訪山腳下的「別子銅山紀念館」，可以從中更深入了解住友集團與新居濱、別子銅山的共榮關係。



Figure 2. The Tonaru district of the Besshi Copper Mines is home to the remains of the ore sorting yard and the ore storehouse, as well as the aerial cableway for transporting ore and household supplies.

圖 2：別子銅山的東平地區保留了貯礦庫、選礦場以及運送礦石和生活物資的空中索道遺跡。



Figure 3. The photos displayed at the Tonaru Historical Museum provide a glimpse into the lives of the people who lived here during the heyday of the Mines.

圖 3：從東平歷史資料館的展示照片中，可窺探礦山全盛時期人們在此地的生活模樣。



Figure 4. The Hadeba Hydroelectric Power Plant, built in 1912, contributed to the industrialization of the Besshi Copper Mines with its large elevation difference (one of the greatest in East Asia at the time). It also boasted cutting-edge generators and water wheels imported from Germany. The power plant is expected to open to visitors as an educational site in 2022, after the completion of its seismic rehabilitation project.

圖 4：舊端出場水力發電所於 1912 年建成，水位落差為當時東洋首屈一指，亦引進德國的發電機與水車，為別子地區的工業化發展帶來龐大貢獻。經過耐震修復後，預計於 2022 年度開放一般民眾見學。

In the “Niihama City Tourism Promotion Plan” released in 2018, industrial heritage is considered an important strategic element. In recent years, Niihama City has also been working with the Sumitomo Group in an effort to renovate the remaining industrial heritage of modernization, such as the Hadeba Hydroelectric Power Plant. In addition to the mining area, the former cadres’ residences in downtown Niihama are also being renovated in an attempt to situate the city’s industrial heritage resources in a wider context.

Niihama, with its industrial past, will continue to face the challenge of using available resources to identify directions for the city’s future development while creating a sense of ownership among local residents.

產業遺產當中，礦山因多數已停止採伐，建築遺構如何保存與活用、相關歷史記憶如何傳承，成為共通問題。如今住友集團將事業重心移轉至大阪，新居濱的城市再造主導權回歸到市政府與居民手中。

2018 年發布的「新居濱市觀光振興計劃」中，產業遺產群被列為基本戰略的主要核心。新居濱市近年也持續與住友集團合作，整備如舊端出場水力發電所等近代化過程中留下的產業遺產，除礦山地區外，座落於新居濱市區內的舊幹部住宅等亦陸續修整完成，試圖從更廣域的概念串聯市內的工業遺產資源。

背負著工業城市的背景，該如何活用既有資源走出新路，並帶動在地居民的自發意識，成為新居濱市今後必須持續面對的課題之一。

“Coal Memory: Special Exhibition on the Centennial of the Pingxi Line and Coal Mine Culture” - the Exhibition and Related Promotional Activities

「煤記憶—平溪鐵道百年暨煤礦文化」特展及系列推廣活動

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The Pingxi and Houtong areas of New Taipei City used to be major coal mining towns in Taiwan, bearing the responsibility of energy production as Taiwan's economy took off. From 1904, when Bing-Zhu Pan, the first head of the Pingxi District, discovered coal blossoms, until the coal mining industry in Taiwan declined in the 1980s, Pingxi experienced nearly eighty years of prosperity in the “Black Gold Age.” The establishment of the Pingxi Line accelerated the development of the coal industry in Taiwan. As mentioned by Yun-Nien Yen in his article “Theory of Mining Operations: Transportation as the Prerequisite for Coal Operations.” The importance of the Pingxi Line to the development of the coal mining industry cannot be overstated. Originally built by the Taiyang Mining Corporation to transport coal from mines, the Pingxi Line was constructed in 1918 and was completed and progressively opened to traffic in 1921. The railway line spurred the development of coal mining settlements in the Pingxi area and was very important to the mining towns along the Northeast Coast and Taiwan.

The year 2021 marks the 100th anniversary of the Pingxi Line. To celebrate the centennial and systematically preserve Taiwan's mining culture, the Bureau of Cultural Heritage, Ministry of Culture, commissioned the National Yunlin University of Science and Technology to conduct research on the preservation of Pingxi and Houtong's coal mine culture. They were also tasked with holding exhibitions and performances centered on the 100-year history of the Pingxi Line. These activities, combined with a series of educational and promotional activities on humanities, local industries, and mining villages, are intended to promote the core values of coal mine culture to the public. With this aim in mind, the National Yunlin University of Science and Technology curated the “Coal Memory: Special Exhibition on the Centennial of



Figure 1. The main visual design for “Coal Memory: Special Exhibition on the Centennial of the Pingxi Line and Coal Mine Culture”

圖 1：「煤記憶—平溪鐵道百年暨煤礦文化」特展主視覺

新北市平溪、猴硐地區曾是臺灣煤礦生產重鎮，背負起了臺灣經濟起飛的能源生產重任，從 1904 年平溪地區第一任庄長潘炳燭發現煤礦露頭開始，直到 1980 年代臺灣煤礦業沒落，平溪地區經歷近八十年繁榮興盛的「黑金歲月」，「平溪鐵道」加速了臺灣煤礦發展。顏雲年曾於《礦業經營論》一文中提及「煤炭經營，首重運輸」，彰顯平溪鐵道對煤礦產業發展的重要性。平溪線於 1918 年開始建設，1921 年竣工並逐步開通，原為臺陽礦業專為煤礦運送之用，同時也帶動平溪地區煤礦聚落的發展，對臺灣與東北角礦鄉皆十分重要。

今年（2021 年）適逢平溪線一百周年，文化部文化資產局為系統性保存臺灣礦業文化，委託國立雲林科技大學從事平溪與猴硐地區煤礦文化保存研究，並且舉辦展演活

the Pingxi Railway and Coal Mine Culture” at the site of the New Pingxi Coal Mine heritage site, formerly owned by the Taiyang Mining Cooperation. The exhibition takes place at the outdoor mining ruins, which are used as the main exhibition site for the first time, featuring ten themes and landscape art to bring the public closer to the coal mine culture. This special exhibition will first introduce the visitors to the railway engineering technology of the Pingxi Line and lead them into the underground world of coal mining, where they can then learn about the coal mine sites along the Pingxi Line. Moving on, the visitors will experience the culture and daily life of the mining community and eventually explore how the Pingxi and Houtong mining communities can sustainably develop tourism in the post-mining era over the next hundred years. In addition, the exhibition uses landscape art to introduce mining remains, such as the railway siding, coal preparation plant, and coal unloading facility of the New Pingxi Coal Mine. By using restoration techniques and artistic displays to simulate coal production, the exhibition offers a deep, immersive visitor experience. Not only can they obtain a wealth of cultural and historical information, but they can also feel as if they have been transported back to the prosperous years of the coal mining industry, as they hear the coal cars roaring by. The exhibition spans eight months, from October 31, 2021, to June 30, 2022. In conjunction with the exhibition, Pingxi is also organizing a series of coal

動，以平溪線鐵道百年歲月為主軸，結合人文、地方產業與礦村聚落的系列教育推廣，期待促進社會大眾更為理解煤礦文化核心價值。鑑此，為慶祝平溪線百歲生日，於原屬臺陽鑛業旗下的新平溪煤礦遺址策畫「煤記憶—平溪鐵道百年暨煤礦文化特展」，首度嘗試將戶外的礦業遺跡作為主展場，以十項主題與地景藝術促進民眾更為親近煤礦文化。本次特展故事線從平溪線鐵道工程技術帶領觀眾進入煤礦開採的地底世界，再由平溪鐵道沿線煤礦場空間指認，延伸至礦村聚落文化與生活日常，最後再從後礦業時期的觀光化議題探究平溪猴硐礦村聚落下個百年該如何永



Figure 3. A corner of the exhibition “Coal Memory: Special Exhibition on the Centennial of the Pingxi Line and Coal Mine Culture.” It recreates the scenes of mining production and the miners’ lives with photographs taken by mining photographer Chien-hsuan Chu

圖 3：煤記憶—平溪鐵道百年暨煤礦文化特展展場一隅，透過礦業攝影家朱健炫老師的觀點，重現礦業生產與礦工生活的樣貌。



Figure 2. “Coal Memory: Special Exhibition on the Centennial of the Pingxi Line and Coal Mine Culture” is exhibited at the coal preparation plant of the Taiwan Coal Mine Museum (also known as the New Pingxi Coal Mine Museum). The picture shows the entrance of the exhibition.

圖 2：煤記憶—平溪鐵道百年暨煤礦文化特展位於新平溪煤礦博物園區選洗煤場，圖為展場入口。



Figure 4. The remains of the coal preparation plant at the New Pingxi Coal Mine. This special exhibition allows the visitors to interact with these mining sites through installation art and equipment identification activities, guiding them to recognize the mining equipment of the past.

圖 4：新平溪煤礦之選洗煤場遺址，本次特展透過裝置藝術與設備指認的方式，與礦業遺址互動，帶領觀眾認識昔日的礦業設備。



Figure 5. The remains of the coal unloading facility at the New Pingxi Coal Mine. This special exhibition allows the visitors to interact with these mining sites through installation art and equipment identification activities, guiding them to recognize the mining equipment of the past.

圖 5：新平溪煤礦之卸煤櫃遺址，本次特展透過裝置藝術與設備指認的方式，與礦業遺址互動，帶領觀眾認識昔日的礦業設備。

mine cultural tours and handicraft activities, hoping to promote the development of its local tourism through the preservation and promotion of the coal mining culture.

“Coal Memory: Special Exhibition on the Centennial of the Pingxi Line and Coal Mine Culture” is held from October 31, 2021, to June 30, 2022, at the coal preparation plant of the Taiwan Coal Mine Museum. Admission is free during the exhibition period. Following the opening of the exhibition, a series of thirty promotional activities will be held successively, with themes covering the cultural landscape, natural ecology, and life in the mining villages around the mine. Visitors can take part in handicraft workshops and cultural experience activities, enjoy the exhibition guided by local seniors, and explore the mining sites along the Pingxi Line. It is hoped that the special exhibition and series activities can preserve the coal mining memories of local residents and strengthen the connection between local communities and mining-related cultural hotspots. In addition, it is expected that the cultural authenticity of the mining history of Pingxi and Houtong will be preserved as the core of local tourism development, reminding us that the memory of coal mining needs to be passed down from generation to generation so that it does not become a “lost memory.”

續發展。礦業遺跡地景藝術方面則是以新平溪煤礦的側線鐵道、選洗煤場、卸煤櫃等礦業遺址，透過情境復原與藝術展演手法模擬煤礦生產光景，讓觀眾親臨礦業現場，不僅能獲得充足的文史資訊以外，還能感受煤礦產業轟鳴作響的繁盛歲月。本次展覽期程長達八個月（2021年10月31日-2022年6月30日），配合本次特展將於平溪聚落舉辦系列煤礦文化旅行與手作活動，期望透過煤礦文化保存與推廣，更為促進在地觀光產業發展。

本次「煤記憶—平溪鐵道百年暨煤礦文化特展」展期為110年10月31日至111年6月30日，展示場地為新平溪煤礦博物園區選洗煤場，展示期間皆為免費參觀，另亦有陸續辦理30場次之系列推廣活動，活動主題將串聯礦場周邊文化地景、自然生態以及礦村聚落，規劃手作工坊與文化體驗活動，邀請在地耆老帶領觀眾除了看展之外，也實地走訪平溪沿線礦業遺址，期盼藉由特展與系列活動的策劃，連結當地居民的煤礦記憶，也強化在地社區和礦業相關文化熱點的連結，讓平溪猴硐地區的礦業歷史成為當地觀光發展的文化真實性內涵，提醒著我們煤礦的記憶，需要世代傳承，以免成為消失的「沒記憶」。

Turn on the TV - Seeing the Cultural Heritage of Taiwan's Television Industry

《打開電視：看見臺灣電視產業文化性資產》

Reviewed by: Wan-Lin Tseng (Research Assistant at the National Museum of Taiwan History)

書評：國立臺灣歷史博物館數位創新中心研究助理 曾婉琳

While reading *Turn on the TV - Seeing the Cultural Heritage of Taiwan's Television Industry* (hereinafter referred to as *Turn on the TV*), I used my cell phone to look up some reference materials, some of which were videos. Cell phones are the main platforms for content transmission in today's world, but from the 1950s to the 1990s, when the three terrestrial television stations (TTV, CTV, and CTS) were prevalent in Taiwan, television was the dominant form of media. Nowadays, almost every person has a cell phone. With easy access to wireless Internet (Wi-Fi) and the convenience of shooting and uploading videos at any time, it can be difficult for us to imagine how hard it was to produce and distribute content in Taiwan when the media landscape was dominated by only three terrestrial television stations. Television, the once-powerful form of media in the past, had a profound impact on people—from daily viewing to political indoctrination; from entertainment to learning.

Turning on the TV is the result of the two projects commissioned by the Bureau of Cultural Heritage, Ministry of Culture, namely "The Evaluation of Taiwan's TV Industrial Heritage System Project" and "The Value Addition and Reuse of Taiwan's TV Industrial Heritage System Project." The projects were implemented for a period of three years (2018-2020) by a team led by Chi-Hsien Tseng, Director of Multi-Media Center, National Tainan University of the Arts.

Turning on the TV can be generally divided into two parts. The first part contains Chapter 1: Overview of the Development of Taiwan's Television Industry and Chapter 2: Development and Evolution of Taiwan's Television Industry. These two chapters focus on the history of wireless television development in Taiwan. By studying the yearbooks and weekly publications issued by the three terrestrial television stations and conducting oral interviews with television professionals, the author delves into the three stations' experiences in producing content for entertainment and political



Figure 1. The cover of *Turning on the TV - Seeing the Cultural Heritage of Taiwan's Television Industry*

圖 1：《打開電視：看見臺灣電視產業文化性資產》封面

閱讀《打開電視：看見臺灣電視產業文化性資產》（以下簡稱《打開電視》）這本書的同時，我也同步用手機查了一些參考資料、有些是影片資料，手機是今日的強勢媒體，而在臺灣老三臺的年代（1950年代至1990年代），電視是強勢媒體。在幾乎人手一機、無線網路（Wi-Fi）無礙、影像可隨拍隨傳的今日，很難想像臺灣在老三臺（臺視、中視、華視）的年代，影像錄製、傳播工作的艱難。但這些強勢媒體深刻地影響著該世代的人，從日常生活到政令灌輸、從娛樂到學習。

《打開電視》一書是由文化部文化資產局委託國立臺南藝術大學音像藝術媒體中心曾吉賢主任帶領的團隊所完成的「臺灣電視產業文化資產體系價值評估計畫」及「臺灣電視產業文化性資產加值再利用評估計畫」兩案、長達3年（2018-2020）的執行成果。

《打開電視》大致上可分為兩個部份，第一部份為第一、二章〈臺灣電視產業發展概述〉、〈臺灣電視產業發展與演變〉，主要講述臺灣無線電視發展歷史，透過當時

indoctrination, creating a vivid and brilliant portrayal of the development of wireless television in Taiwan. The book also explores how the government interfered with television programs during Taiwan's Martial Law Period, how all sectors of the television industry, including production and broadcasting, cooperated, and how television professionals managed to unleash their creativity and realized their potential despite the limited resources they had.

The second part consists of "Chapter 3: Cultural Heritage and Census of Taiwan's Television Industry", "Chapter 4: Revitalization and Reuse of Cultural Heritage of Taiwan's Television Industry", and "Chapter 5: Conclusion". These three chapters explore the implementation of the above-mentioned two projects from the aspects of the Cultural Heritage Preservation Act, the census practices, the inventory of intellectual property rights, as well as the value-added reuse of film and TV cultural artifacts in Taiwan and abroad. Such content can serve as references for other TV and film production companies as they conduct their own censuses in the future. The above two projects achieved the outcome of digitizing film and TV cultural relics and obtaining census results; however, it is a pity that no database has been set up for the public to access the results of the projects.

It has been more than 60 years since television programs were first aired in Taiwan. The television industry, with its use of software and hardware, is tied to many important historical events and memories of the Taiwanese people, particularly after World War II. Efforts to preserve and maintain the cultural assets of the television industry must be made without delay. However, due to the fierce competition from cable TV networks, the three terrestrial television stations in Taiwan lack sufficient resources to conduct individual cultural heritage census for themselves. *Turn on the TV - Seeing the Cultural Heritage of Taiwan's Television Industry* has set a precedent for cultural heritage conservation in Taiwan's television industry. However, as noted in the book: "In order to encourage local television stations to ramp up their efforts to protect their own heritage, the government authorities must work together with the film and television industry, the legal profession, and the cultural heritage sector to create a more supportive and diverse environment for cultural heritage conservation."

老三臺臺內發行的年鑑和週刊、電視人口述訪談…等等，內容結合娛樂、政治教化以及工作實務經驗，豐富且立體地描繪出臺灣無線電視發展，精采好讀。我們看到戒嚴時期政府對於電視節目的各種干涉，也看到在電視產業中，節目製播各環節工作中，各方如何協力完成，更在有限的資源下，電視人如何發揮創意，走出一片天。

第二部份則是第三、四、五章〈臺灣電視產業文化性資產與普查〉、〈臺灣電視產業文化性資產的活化與再利用〉、〈結語〉，則是從《文化資產保存法》、普查實務、權利盤點、國內外影視文物加值再利用的狀況，細數前開兩個計畫的執行面，更可作為未來其它影視機構進行普查的執行規劃參考。然而，據了解前開兩案的影視文物雖已數位化，也有普查成果，但未建置資料庫供民眾查詢，實為可惜。

臺灣人打開電視至今，已逾 60 餘年，電視產業的軟硬體承載著臺灣戰後各大重要歷史現場與常民記憶，這些文化資產的保存維護刻不容緩，然而囿於老三臺在現今有線電視產業競爭激烈的環境，各項資源不足，難有多餘的心力面對各自臺內的文化資產普查等工作。《打開電視：看見臺灣電視產業文化性資產》這本書為電視產業文化資產的維護工作開了頭，但也語重心長的說道「這些問題都須中央主管機關偕同電影電視、法律、文資各界集思廣益，以打造適應更多元的文化資產環境，增加電視臺為歷史資產付出更多心力保護之意願」。

Way Back to Memoirs of Houtong Coal Miners

《黑暗的世界：猴硐礦工回憶錄》

Reviewed by; Chu-Kuan Hsu (Chairman of The Association of Urban-rural Development Taiwan)

書評：臺灣城鄉特色發展協會理事長 許主冠

Most books on miners or the mining industry, especially those from the past, are written on informative or historical data, or related industry research. Books that interpret the life experiences and memories of the miners are relatively rare. As one such book, *Way Back to Memoirs of Houtong Coal Miners* narrates the history of the ordinary people, attempting to establish, from the bottom up, a new perspective of Taiwan's history, which is collectively written and experienced by the Taiwanese people. Over the past decade, the Ministry of Culture has also been encouraging the public to write and reminisce collectively through projects such as Story Taiwan, which primarily collects image-based stories, and the Taiwan Cultural Memory Bank, which collects data and digitalizes "memories" based on more rigorous methods of interpretation and writing. It is hoped that by collecting national memories, more people can be involved in the formation of cultural awareness in Taiwanese society.

Coal mining marked the beginning of all mining industries in Taiwan and has gone through several major phases over the course of more than 120 years. The first phase was around the end of the Qing Dynasty. At that time, the Western powers had become industrialized. Looking for new markets, they came to East Asia. Back then, all ships were steam powered and needed to replenish their coal and water supplies. Keelung, in northern Taiwan, was coveted by western countries because of its geographical location and suitable harbor conditions. After the Sino-French War, Taiwan entered into the early stages of industrialization, and after the Sino-Japanese War in 1895, Taiwan was ceded to Japan, and Japan began to systematically investigate and operate Taiwan's coal mines to accumulate momentum for industrialization. The second phase was the peak of the mining industry occurring in the middle and late Japanese colonial rule, when large amounts of energy were needed for

相較於過往討論礦工或礦業的書籍，多數是資料與歷史的陳述，或是做相關的產業研究的論述，從礦工本身的生命經歷、記憶來做一個詮釋，相對是比較少見的，因此從本書的內容言，可以說是延續自近十幾年來，從庶民歷史著手，試圖由下而上的建構出一個從共筆到共感新的臺灣歷史觀點；恰好文化部也在機制上提供了以影像為主的國民記憶庫臺灣故事島到近年更嚴謹的詮釋資料撰寫方式，將記憶數位化的國家文化記憶庫，希望透過慢慢地共同書寫，沉澱記憶，透過這些國民記憶，牽動更多相關人，彼此之間共同形成一個台灣社會的文化感。

臺灣的礦業，以煤礦開採時間最早，長達一百二十多年，其間經歷過幾次不同的大階段，第一個階段約是在清朝末年，西方列強以工業化之後，需要新市場而進入東亞，因為當時船艦均為機械動力船，需要補充煤、水，臺灣北部的基隆地理位置、港灣條件均適合。於是被西方國家覬覦，清法戰爭後也開啟對臺灣的初期工業化，在 1895 年清日戰爭後，臺灣割讓給日本，日本也有計畫的調查、開採全台的煤礦來作為工業化的動力。第二個高峰時期在日治的中後期，因為戰爭需要大量的能源，以及第三個時期在民國六十年左右。適逢全世界第一次的石油能源危機，在尋求能源自主政策下，政府也鼓勵民間參與開採煤礦。

所以在過往歷史中，煤礦就是臺灣經濟景氣與社會發展的一個隱藏動力軸心。不但驅動了經濟，更創造困境中臺灣的新生機會。因此當民國七十年代全面停礦後，相關的從業人員在面對產業的消逝，心中的感觸可想而知，我們也可以從這本著作中清楚的感受到一種當光榮時刻消失後的失落與落寞，以及希望留住記憶的急迫感。作者周朝南理事長，本身從事礦業超過一甲子，也曾不同的煤礦公司服務、因此他的生命經驗可以說就是一部近代煤礦產業的百科全書，不管從工作上，從生活上乃至於生命的回顧都有深刻體悟，在本書當中也有畫龍點睛的描述，在書裏值得我們注意的是，在一般經驗中，我們對於礦工的認知其實是非常簡單，直覺以為所謂的礦工就是直接挖礦的工作者，其實礦業是一個百工的系統，有各種各樣的工藝匠師，在一個非常狹小的環境當中，彼此相互應依賴，相互支援，然後形成一個非常緊密的工作圈跟生產鏈。由於這樣的特殊的工作環境、也讓他們彼此之間的感情非常的



Figure 1. The cover of Way Back to Memoirs of Houtong Coal Miners

圖 1：《黑暗的世界：猴硐礦工回憶錄》封面

the war. The third phase came during the 1970s, when the world's first oil and energy crisis occurred and the government promoted the policy of energy autonomy and encouraged private participation in coal mining.

Looking back on Taiwan's history, coal mining was in fact a secret driving force of Taiwan's economic boom and social development, not only driving the economy, but also creating new opportunities for the then struggling nation. Therefore, when Taiwan's mining industry ceased operations in the 1980s, one can only imagine the feelings of those in the industry as they witnessed the demise of mining. Reading this book, we can clearly feel the loss and despair of the miners after seeing the moments of glory disappear and their desperation as they tried to keep those memories alive. The author of the book, Mr. Chao-Nan Zhou, President of the Mining Retiree Exchange Association, had been in the mining industry for over 60 years and had worked for various coal mining companies. His life experience

特殊，不只是生活工作連結，甚至是生命相依，這種情感在臺灣產業當中，非常特殊。也因此在本書後段談及礦工上街申訴勞動權益以及面對礦災的記憶，其實也使最深沉的吶喊。

最後，本書架構上，並未依循一定的結構或時間軸做論述，反而比較發散，是一篇篇小的文章，從生活記憶、生命感受的片段著手，也許有讀者會期待可以有較完整的系統性描述或知識系統，但也許作者的期待本書並非呈現知識性的專書，反更像是一種生命的回顧，還原當時生活的點滴，以及顛覆一些礦工傳統印象，因此覺得用輕薄短小的文章更可以窺見一個與當下時代想像不同的職業內情，例如談及礦工學習國標舞、礦工福利、出遊、尾牙聚餐等等。應該都是用這樣的概念來思考的，也許更有期待是希望擺脫過往悲情的宿命。在退休之後再回頭人生過往，期待看見的是芬芳的玫瑰，記住的是歡笑愉悅。

can be described as an encyclopedia of the modern coal mining industry. His profound reflections on his work, life, and his life story are brilliantly portrayed in this book. What is worth noting is that our general perception of miners is that they are simply workers who mine, but mining is an all-embracing industry, requiring a variety of craftsmen. They rely on and support each other in a very small environment, forming a very tight-knit working circle and production chain. The special working environment allowed miners to build a special bond with each other, not only in life and work, but even in survival. Such deep attachment is hard to find within other industries in Taiwan. Therefore, when reading the descriptions in the second half of the book about the miners taking to the streets to voice their labor rights and narrating their memories of mining disasters, one can almost hear the depth of the cries from the bottom of the miner's hearts.

Finally, this book does not follow a certain structure or timeline for its content. It is a collection of short articles on the miners' memories and life experiences in a rather diffuse manner. Some readers may expect this book to be more complete, systematic, or informative

in its descriptions. However, the author's intention was perhaps not to position this book as an intellectual monograph, but as a retrospective depiction of miners' lives, while recreating the life scenes of that time, while overturning some of the traditional impressions that the public has of miners. The author may have chosen to write short articles about miners learning ballroom dancing, as well as miners' welfare, travel experiences, year-end parties, etc. because he wanted to give readers an inside look at a profession that is different from what modern people imagine. He may also be expecting that, when the miners read the book and look back on their lives after retirement, they will see not the sad fate of the mining industry, but a past as beautiful as a blooming rose with memories that remind them of laughter and joy.

Taiwan**Exhibition Series of Engineering Education in Taiwan IV—****Anchors Aweigh: Naval Architecture and Harbor Engineering****大船出港：造船與港灣工程－工程教育史系列展 IV**

Date 活動日期：1th November 2021 to 30th April 2022/ 2021 年 11 月 11 日至 2022 年 4 月 30 日

Place 活動地點：Tainan City, Taiwan/ 臺南市，臺灣

Organizer 主辦單位：

NCKU Museum

成大博物館

Official Web 活動官網：

<https://museum.ncku.edu.tw/p/406-1008-230335,r2483.php?Lang=zh-tw>

Information 活動說明：

Since 2015, NCKU Museum at the National Cheng Kung University (NCKU) has been researching and organizing a series of exhibitions, highlighting its important and distinctive role in Taiwan's industrial and engineering education. Past exhibitions included: The Series Exhibition of Engineering Education in Taiwan (I): The Brief History of Engineering Education in Taiwan, The Exhibition of History of Engineering Education in Taiwan (II): Power! Sources of Electricity, The Exhibition of History of Engineering Education in Taiwan (III): Keying Toward Success—Taiwanese Railway and NCKU. This year's exhibition "Anchors Aweigh," using "ports" and "ships" as its main themes, reviews the history of engineering education in NCKU. It also echoes the development of engineering technologies and their indispensable role for Taiwan and showcases how Taiwan, an island surrounded by sea on all sides, utilizes these technologies to communicate with the world.

自 2015 年起，成大博物館透過研究和一系列展示「臺灣工程教育史簡史」、「勢！工程教育史系列展 II：電力泉源展」、「鐵定成功－工程教育史系列展 III：鐵道」呈現成功大學在臺灣工業教育史上之重要性與特色。本次展覽「大船出港」以「港埠」及「船舶」為標的，回顧成大相關科系之工程教育史，以呼應四面環海的島嶼臺灣，欲與世界溝通所必備之工程技術其發展歷程。

Mexico

The V International Seminar of TICCIH Mexico -

“Communications, Transportation and Related Industries: Management, Valuation and Communities”

國際工業遺產保護委員會墨西哥分會 (TICCIH Mexico) 第五屆國際研討會 -

「通訊、交通運輸與相關產業：管理、評估與社群」

Date 活動日期：23th-26th February 2022/ 2022 年 2 月 23 日至 26 日

Place 活動地點：Plaza de las Tres Centurias, Aguascalientes, Mexico / 三世紀廣場，阿瓜斯卡連安特，墨西哥

Organizer 主辦單位：

TICCIH Mexico, A.C. and the Government of the State of Aguascalientes

國際工業遺產保護委員會墨西哥分會、阿瓜斯卡連安特市政府

Official Web 活動官網：

<http://www.seminarioticcihmexico.com/home.html>

Information 活動說明：

The V International Seminar of TICCIH Mexico, which focuses on the study of the heritage legacy of Communications, Transportation and Related Industries, aims to contribute to the experiences exchange on knowledge, management, recognition, media presence, safeguarding, restoration and reuse of the vast tangible and intangible heritage generated by those systems.

Among them, we can emphasize the universes of railroad, telegraph, telephone, ports or any other mobility means linked to agroindustry, mining, steel industry, textiles or any other industrial activity, as well as the role of the communities that created those assets or the communities that are responsible of their preservation.

Transportation systems have left a range of remains since pre-Hispanic times up to the 20th century, both in land and water depending on the characteristics of each region which is part of the current Mexican territory.

Road networks configured regions and, later on, the railroad reshaped the territory, this originated different human settlements production and commerce centers, or they simply encouraged the growth and development of already existing centers.

國際工業遺產保護委員會墨西哥分會 (TICCIH Mexico) 第五屆國際研討會以通訊、交通運輸與相關產業文化資產為主題，期望促進這些產業體系所蘊含的有形與無形文化資產知識、管理、認證、媒體形象、維護、保存與再利用等經驗交流。

本次研討會著重於鐵路、電報、電話、港口及其它運輸相關農工、礦業、鋼鐵業、紡織業等產業活動，並關注參與這些產業製作及維護保存的群體。

墨西哥領土上各區域依其特徵，留存著前西班牙時期到 20 世紀大範圍的水路與陸路交通運輸系統遺跡。

這些道路網的鋪設決定了區域劃分，其後的鐵路系統則重新形塑了領土樣貌，催生出不同的人群聚居空間與商業中心，或促使原有的貿易中心更加蓬勃。

在許多案例中，當地社群發展皆依循自身定居模式，其建材、結構體系、技術及建築風格等，均成為當地社群身分認同構築的一部分，值得被保存並加以分析。以普遍模式為基礎，這些交通運輸系統往往透過技術、領地、結構與組織的革新，以特地各個地區的人群、材料、經濟資源、地理及氣候特徵等。

上述活動留下的歷史痕跡、知識與見證，都是墨西哥產業文化資產重要的一環，相關的研究分享將是本次研討會的主要重點。

In most cases, they followed their own settlement patterns that, together with materials, construction systems, techniques and architectural styles, provided them a particular identity that can be rescued to be analyzed. Starting from a common practice, the installation of these transportation means gave rise to several technological, territorial, construction and organizational innovations that allowed their adjustment to the specific human, material and economic resources of each location site, as well as to their geographic and climate characteristics.

Traces, knowledge and testimonies generated by all these activities, are part of the great Mexican industrial heritage and their study is the main purpose of this seminar.

presents an overview of the building's restoration and revitalization process.

UK**7th WTA Colloquium – Maintenance of Concrete Buildings****第七屆 WTA 研討會 – 混凝土建築的維護****Date** 活動日期：10th June 2022/ 2022 年 6 月 10 日**Place** 活動地點：Shropshire, UK/ 施洛普郡，英國**Organizer** 主辦單位：

Delft University of Technology, The Netherlands

台夫特理工大學，荷蘭

Official Web 活動官網：<https://www.wta-international.org/de/veranstaltungen/7th-wta-colloquium-maintenance-of-concrete-buildings/>**Information** 活動說明：

Concrete heritage buildings from the 20th century are at risk, due to the absence of recognition of the historic values of these buildings as well as to the lack of knowledge of the specific characteristics of historic concrete structures. Frequently, solutions developed for repair of contemporary structures are applied to historic concrete buildings, resulting in interventions which are neither compatible nor durable.

The scope of the lectures ranges from the possibilities of new investigation methods and procedures of condition assessment, from the application of innovative materials to the use of heritage precast concrete elements. In addition, main results from relevant case studies are presented.

The Colloquium aims at providing building owners, employees from planning and engineering offices, construction companies, concrete experts, architects and representatives of authorities, with the latest developments in the field of conservation of concrete historic buildings, as resulting from practice and from international research projects.

20 世紀的混凝土文資建築，由於大眾缺乏對其歷史價值及建築結構特色的認知，正面臨保存危機。現今的混凝土歷史建築修復方式，普遍為直接套用當代建築結構的修復工法，但這樣的做法既不適用也不持久。

本場研討會聚焦於混凝土歷史建築上，探討可能的創新調研方法與狀況評估程序，範圍囊括創新材料的應用到預鑄混凝土 (precast concrete) 歷史構件的使用。此外，相關案例研究成果也將於研討會上發表。

本研討會向建築物的所有者、規劃與工程業的員工、建築公司、混凝土專家、建築師及當局代表等群體開放，提供混凝土歷史建築保存領域，以及國際案例研究與實作中獲得的最新發展成果。

UK

UK Coal and Industrial Heritage Tour

英國煤礦與產業文化資產之旅

Date 活動日期：25th June 2022 at 8:00 PM to 5th July 2022 at 9:00 AM (UTC+08) /
2022年6月25日下午8:00 – 2022年7月5日上午9:00(UTC+08)

Place 活動地點：Scotland, England, and Wales, UK/ 蘇格蘭、英格蘭及威爾斯，英國

Organizer 主辦單位：

Pennsylvania Anthracite Heritage Museum
美國賓州無煙煤遺產博物館

Official Web 活動官網：

<https://www.facebook.com/events/547316502524781/>

Information 活動說明：

Please Join the Anthracite Heritage Museum for an Industrial History and Heritage Tour (and more) of the UK.

From approximately June 25 – July 5, 2022, Departing from Scranton

Would you like to visit historic cities and towns in Scotland, England, and Wales, including:

- Edinburgh, Scotland • Newtongrange, Scotland
- Newcastle, England • Gloucester, England
- York, England • Bradford, England
- Cardiff, Wales • Pontypool, Wales
- Rhondda Valley, Wales • Blaenavon, Wales

Would you like to experience important industrial history sites and museums in Great Britain, related to:

- railroads • coal mines and collieries
- canals & canal boats • industrial villages
- cotton mills • mining disasters

And also visit:

- a great medieval cathedral • an industrialist's palace & gardens
- a 19th century pub • a national folk museum and royal mint

歡迎參加由無煙煤遺產博物館主辦的英國工業歷史與文化資產之旅。

本次旅行預計於2022年6月25日至7月5日，自美國斯克蘭頓市(Scranton)出發，將帶領參與者探訪蘇格蘭、英格蘭及威爾斯的歷史城鎮：

- 蘇格蘭的愛丁堡(Edinburgh)與紐頓格蘭奇(Newtongrange)
- 英格蘭的紐卡索(Newcastle)與格洛斯特(Gloucester)
- 英格蘭的約克(York)與布拉德福(Bradford)
- 威爾斯的卡地夫(Cardiff)與龐蒂浦(Pontypool)
- 威爾斯的朗達卡嫩塔夫(Rhondda)與布萊納文(Blaenavon)

同時也將帶大家造訪英國重要的工業歷史遺址與博物館(包含下列類別)：

- 鐵路 / 煤礦與採煤場
- 運河與運河船 / 工業村
- 紡織廠 / 礦災遺址

此外，也將造訪：

- 宏偉的大教堂 / 工業家的宮殿與花園
- 19世紀的酒吧 / 國家民俗博物館與皇家造幣廠

Would you like to speak to British coal miners, canal boatmen, and other knowledgeable persons, while traveling with a friendly local group and two experienced local leaders:

- Beth Landmesser and Bob Wolensky

The trip is sponsored by the Anthracite Heritage Museum of Scranton, and Bode Morin, the AHM's site administrator, will also participate in the tour.

最後，在本次的旅行中，能在當地友好組織與兩位資深在地導覽 Beth Landmesser 與 Bob Wolensky 的帶領下，與英國礦工、運河船工及其他知識淵博的人進行交流。

本次行程由美國賓州斯克蘭頓無煙煤遺產博物館贊助，博物館的駐點行政人員 Bode Morin 也將參與本次的旅程。