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IN MEMORIAM

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Chen Jiyu (1921–2017)



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Chen Jiyu, a pioneer in Estuarine and Coastal Science in mainland China, died on 28 November 2017, at the age of 96 in Shanghai, China. He was a pleasant, graceful, and witty person, a pleasure to know. I feel compelled to write this obituary for him, since his death has suddenly deprived me and others of a good and kind friend.

Chen was born on 17 September 1921, in Hengchun Village, Baixian Town, Guanyun County, Lianyungang City, Jiangsu Province, China. He studied at Donghai Normal School in 1935 and 1936. His school was bombed by the Japanese air force in 1937. Chen went on to study at Jiangsu Province First Union School in 1938. However, his schooling moved around mainland China because of the Second World War. In 1941, Chen entered the Department of History and Geography at the National Che Kiang University (currently Zhejiang University) at Yongxing, a suburb of Zunyi City, Guizhou Province, China. He moved to the headquarters of the University at Zunyi City in 1942, where he met his future wife, Liu Yongyu (14 February 1928–6 February 2016), and graduated in 1945. He then continued his postgraduate research there under the guidance of Ye Liangfu (1894–1949), M.Sc. (Columbia), completing his thesis entitled *On the Geomorphology of Hangzhou Bay*. In 1946, Chen relocated to Hangzhou with the University from Zunyi City.

The Department of Geography of Zhejiang University, Hangzhou, was incorporated into East China Normal University, Shanghai, in 1952. Chen began his career at East China Normal University, as a lecturer, later becoming associate professor, and in 1978, professor. Chen suffered significant hardship during the turbulent Cultural Revolution, and could not have survived, in his own words, without the love and full support of his wife.

Chen's scientific mind was not mathematically trained but deeply intuitive. This fitted well with his interests in estuarine and coastal geomorphology and sedimentology. Chen sought knowledge widely. He was inspired by the ideas of traditional ancient Chinese river hydraulic engineers, such as Pan Jixun (1521–1595), who had proposed the idea of "clearing sediments with converging flow." He was also influenced and inspired by a number of Western scientists in one way or another. For example, in 1945, Ye suggested Chen read the work of Douglas Wilson Johnson (1878–1944) *Shore Processes and Shoreline Development* (Johnson, 1919). In March 1957, the Soviet estuarine geomorphologist, I.V. Samoylov, who was invited to be a scientific advisor by the Chinese Academy of Science, presented a series of lectures that Chen attended on estuaries, which were published as a Chinese book (Samoylov, 1958) by Science China Press. In 1959, the Soviet coastal geomorphologist, V.P. Zenkovich, was invited by the Ministry of Transportation of China to advise on the study of siltation in Tianjin New Harbour, while Chen was one of the Chinese scientists assigned to study this problem. Chen's thinking was also influenced by English literature, international travelling and visiting, and attending international conferences.

In the winter of 1960, Chen proposed the conceptual idea of "Dynamic Geomorphology" (in its original Chinese translation, but it seems to be equivalent to the phrase "Morphodynamics" which later appeared in English literature), and he edited the first Chinese Lecture Notes on Coastal Dynamic Geomorphology. Adopting and integrating approaches from other scientific disciplines, Chen applied the following approaches to the studies of estuarine and coastal morphodynamics and sediment dynamics: (1) integration of macroscale and microscale approaches; (2) integration of dynamics, sedimentology, and geomorphology; (3) integration of phys-

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ical, biological, and chemical processes; and (4) integration of exploitation and regulation. Chen pioneered the transition of estuarine and coastal geomorphology and sedimentology into estuarine and coastal morphodynamics and sediment dynamics (processes) with successful engineering applications in mainland China. In doing this, he brought together mathematicians, physicists, biologists, and chemists into Chinese estuarine and coastal science. But this was not merely an academic or bureaucratic endeavour. Throughout his career, Chen reiterated the importance of field work to estuarine and coastal science. Even after 90 years old, Chen was still leading field trips to the Changjiang River estuary and its surrounding coastline.

From the late 1970s, Chen's belief in international collaboration and scientific exchanges led him to make a number of friends in the West, including Jerry R. Schubel and Chen Ning Yang of Stony Brook University, Norbert P. Psuty of Rutgers University, H. Jesse Walker of Louisiana State University, Doeke Eisma of the Netherlands Institute of Sea Research; the latter two became his lifelong friends. Chen and his associates reintroduced the Changjiang River estuary to the Western world in the early 1980s. For example, the developmental model of the mouth of the Changjiang (Yangtze) River over the last 2000 years by Chen *et al*. (1982) was cited in Dyer (1986, p. 7). Chen co-edited a book entitled Engineered Coasts with Doeke Eisma, K. Hotta, and H. Jesse Walker (Chen *et al*., 2002). Chen's pervasive influence sprang from a number of factors. First, he and his associates founded a school of estuarine and coastal science in mainland China, which became part of the State Key Laboratory of Estuarine and Coastal Research, for which he was the Scientific Advisor from its inception. Chen and his students Yun Caixing (1935–2015), Yu Zhiying, Mei Anxing, Huang Jingshen, and Ye Qingzhao established an estuarine laboratory in 1957. Under Chen's leadership, together with the full support of Yun Caixing, Wang Baocan, Shen Huanting, Yu Zhiying, and many others, the State Key Comprehensive Laboratory of Estuarine and Coastal Dynamic Sedimentology and Dynamic Geomorphology was officially approved in December 1995. Second, together with first You Fanghu (1928–2005) and then Song Daquan (1912–1988) and Yan Kai (1912–2006), he initiated, co-organized and co-guided the National Coastal Zone and Tidal Flat Resources' Comprehensive Survey. Third, through his personal research achievements: he proposed the Development Model of the Changjiang River estuary and provided the scientific principles for the site selection of the Deep Water Navigational Channel of the Changjiang River estuary and estuarine regulation and the construction of the Qingcaosha Reservoir's Construction. Fourth, he proposed his famous idea of the regulation for the Changjiang River estuary, so called "three cows' noses," *i.e*. three bifurcation mouths, of the South/North Passages, of the South/North Channels, and of the South/North Branches. Fifth, he initiated the Chinese Society of Estuarine and Coastal Science.

After reading the biographical memoir of George Keith Batchelor (1920–2010) by Keith Moffatt (2002, pp. 33–35), I found surprising similarities between Chen and Batchelor, even though Chen was largely nonmathematical and Batchelor was mathematically based. Chen was only one and a half years younger than Batchelor. They established their own scientific laboratories at the same time. Overall, the establishment history of the Estuarine and Coastal Research Laboratory headed by Chen in mainland China since 1957 was very much like that of Department of Applied Mathematics and Theoretical Physics headed by Batchelor in England since 1959. Like Batchelor in England, Chen's determination and meticulous planning were equally needed in his long-term task of first setting up and then developing the Estuarine and Coastal Research Laboratory. At this time (also in the 1950s), no scientific research laboratory existed at teacher-training–oriented East China Normal University, and he regularly faced hostility in the different periods of laboratory development from the traditional geomorphologists, the Department of Geography, and university authorities.

Chen's success was indeed the result of being in the right place (Shanghai) and at the right time (during China's fast development). Throughout his academic life two people, Chen always told me, particularly aided him by providing him and his associated estuarine and coastal science with an appropriate position. They were Zeng Zenkui (1909–2005), a leading Chinese oceanographer, and Yan Kai, a pioneer in Chinese coastal engineering. The Chinese estuarine and coastal sciences Chen pioneered have been a unique part of Chinese oceanography and Chinese coastal engineering ever since.

Chen served on the Editorial Board of *Estuaries* (now *Estuaries and Coasts*) and was honoured by academies in mainland China and abroad. He was elected to the International Eurasian Academy of Sciences in 1996 and the Chinese Academy of Engineering (Division of Civil, Hydraulic, and Architecture Engineering) in December 1999. After his election to the Chinese Academy of Engineering, we talked on the phone and he was very happy since he had no formal training in engineering. Chen received a Lifetime Achievement Award from the Estuarine & Coastal Sciences Association (ECSA), which was presented by ECSA Chairman Geoff Millward at ECSA 53 in October 2013 in Shanghai. He was awarded the Memorial Medal for Lifetime Contributions to Ocean by the State Oceanic Administration of China in 2016.

Like many other educated Chinese scholars before the first half of the 20th century, Chen was spiritually rooted in the traditional Chinese culture and philosophy, mainly, Confucianism. The idea or philosophy of one's life in his mind was to serve one's country and one's people with one's full loyalty. This was reflected in each piece of work in which he was involved. On 20 December 1990, for example, Chen wrote to the Mayor of Shanghai that Shanghai Pudong International Airport should be constructed on the tidal flats of the south bank of the Changjiang River estuary, on the coast of the Pudong development zone to the east of Shanghai. This proposal was accepted. Chen was a visionary, and his breadth of knowledge was immense as reflected in his papers. Chen was also an inspiring mentor and educator.

The Master said, "The wise man delights in water, the Good man delights in mountains. For the wise move; but the Good

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stay still. The wise are happy; but the Good, secure" [Analects, Book VI, 21]. Despite the *turbulence* experienced throughout his life, Chen loved water and mountains and was both the wise and the Good to many.

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