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The edible tide: How estuaries and migrants transformed the Straits of Melaka, 1870–1940

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The Straits of Melaka have long played a central role in the history of Southeast Asia, from facilitating the movement of people, ideas, and commodities to marking the salty edge of states, empires, and sultanates. Networks, circulations, and mobilities have shaped our vision and understanding of this waterway. This article charts a different kind of story, one that explores the Straits not as a space of passage but rather as a place of production. It shows how and why these waters became an industrial fishing zone — an industrial estuary, as it were — in the late nineteenth and early twentieth centuries. Through the case of Bagan Si Api Api, a Hokkien-built town at the mouth of Sumatra's Rokan River, it explains why estuaries and migrants were central to Southeast Asia's urban rise from 1870 to 1940. By looking at the Straits during this pivotal moment, the article reveals the ways in which ecologies, beliefs, technologies, and cultures all combined to shape not only the economic life of Southeast Asia's estuaries, but also, and more importantly, the place of these estuaries in the region's economic life.

The Straits of Melaka have long played a central role in the history of Southeast Asia, from facilitating the movement of people, ideas, and commodities to marking the salty edge of empires, states, and sultanates.[1] Networks, circulations, and mobilities have, indeed, shaped our historical vision and historiographical understanding of this multi-scalar waterway. Since the 1950s, the Straits of Melaka have also become

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1 See for example, Eric Tagliacozzo, *Secret trades, porous borders: Smuggling and states along a Southeast Asian frontier, 1865–1915* (New Haven, CT: Yale University Press, 2005); Leonard Y. Andaya, *Leaves of the same tree: Trade and ethnicity in the Straits of Melaka* (Singapore: NUS Press, 2008); and Su Lin Lewis, *Cities in motion: Urban life and cosmopolitanism in Southeast Asia, 1920–1940* (Cambridge: Cambridge University Press, 2016).

one of the busiest shipping lanes in the world. Nearly 150,000 vessels pass through the Straits each year, moving more than half the planet's traded goods and approximately a third of its energy supply.[2] In today's age of commerce, the Straits are vital arteries of trade, society, and security; indeed, as an industrial highway, they are integral to globalisation and geopolitics.

But from the late nineteenth century to the end of the interwar period, the Straits of Melaka also mattered in economic and ecological terms. It was during this period that they became an industrial fishing zone — an industrial estuary, as it were. The rise of industrial fishing transformed Southeast Asia's rural and urban landscapes, fuelling the rapid growth of cities, infrastructure, plantations, and mines. Sourced from newly opened aquatic environments, food fish — rather than mass quantities of beef or pork — provisioned the region's epic commodity boom and its concurrent demographic surge.[3] By 1940, for instance, Southeast Asia produced most of the world's supply of abaca, tobacco, pepper, copra, quinine, and palm oil and nearly all of its rubber and tin, leading the British colonial-scholar, J.M. Gullick, to refer to this period as the 'age of rubber and tin'.[4]

Human migration sustained Southeast Asia's remarkable commodity boom, more than doubling the region's population from 83 million to almost 200 million in the decades between 1890 and 1940.[5] For the nearly 30 million Indian and Chinese migrants who travelled to the region to tap rubber, extract tin, move cargo in and out of ports, ply the streets, and open shops, fishery products constituted a principle source of animal protein.[6] Abundant supplies, technological changes, and infrastructural improvements made food fish within economic reach of most working people. For reasons of economic choice and cultural practice, local populations also relied on fishery products for large portions of their daily caloric intake. *Belachan*, *bagoong* and *bilis* (fermented prawn-paste and anchovies) were crucial to local diets because they stimulated the consumption of rice, vegetables, and other plant-based proteins.[7] Edibility mattered, but so did palatability.

2 See for example, Noraini Zulkifli, Sharifah Munirah Alatas and Zarina Othman, 'The importance of the Malacca Straits to Japan: Cooperation and contributions toward littoral states', *Jebat: Malaysian Journal of History, Politics & Strategic Studies* 41, 2 (2014): 80–98. See also Nippon Foundation, 'Safety in the Straits of Malacca and Singapore' (n.p., 2014); available at: https://www.nippon-foundation.or.jp/en/what/projects/safe_passage.

3 I examine the role of food fish in the rise of urban Southeast Asia in my book-in-progress, *The edible ocean: Science, industry, and the rise of urban Southeast Asia* (under contract with Yale University Press).

4 J.M. Gullick, 'The Negri Sembilan economy of the 1890's', *Journal of the Malayan Branch of the Royal Asiatic Society* (*JMBRAS*) 24, 1 (1951): 38.

5 Anthony Reid, *A history of Southeast Asia: Critical crossroads* (Oxford: Wiley Blackwell, 2015), p. 263; and Peter J. Rimmer and Howard W. Dick, *The city in Southeast Asia: Patterns, processes and policy* (Singapore: NUS Press, 2009), p. 9.

6 For the scale of migration in the late 19th and early 20th centuries, see Sunil S. Amrith, *Migration and diaspora in modern Asia* (Cambridge: University of Cambridge Press, 2011), esp. pp. 18–19.

7 See A.G. van Veen, 'Fermented and dried seafood products in Southeast Asia', in *Fish as food, vol. III; Processing: Part 1*, ed. Georg Borgstrom (New York: Academic Press, 1965), pp. 227–50; Tadashi Mizutani et al., 'A chemical analysis of fermented fish products and discussion of fermented flavors in Asian cuisines', *Bulletin of the National Museum of Ethnology* 12, 3 (1987): 803; Kenneth Ruddle, 'The supply of marine fish species for fermentation in Southeast Asia', *Bulletin of the National Museum of Ethnology* 11, 4 (1987): 997–8; and John G. Butcher, *The closing of the frontier: A history of the marine fisheries of Southeast Asia, c.1850–2000* (Singapore: ISEAS, 2004), p. 34.

The Straits of Melaka were at the heart of Southeast Asia's urban rise and changing economic life. Prior to 1870, intertidal estuaries were ecological zones that were largely untouched from the nets of mass production. Fished for sustenance, they were not exploited as sites of industry. Yet as cities swelled, commodities boomed, populations surged, and infrastructure expanded, it was the production of food fish that powered the human activities shaping Southeast Asia in the 'age of rubber and tin' — food fish that came from the Straits of Melaka's estuaries and the Chinese fishing villages borne from them. Built around river mouths, these migrant communities produced massive amounts of food, feed, and fertiliser that transformed not only the economic importance of the Straits but also the 'somatic landscape' of Southeast Asia.[8]

This article looks at the rise of these Chinese fishing villages and their role in matters of production and provisionment through the story of Bagan Si Api Api (Bagan).[9] Anchored in the muddy waters of Sumatra's Rokan River, Bagan quickly became one of the world's largest fishing ports in the early twentieth century.[10] Its Hokkien fishworkers combined environmental knowledge with Malay fishing technologies to open and harness the Rokan estuary, converting it into a site of industrial production. The article concludes by briefly considering how the postwar period yielded new currents that not only threatened Bagan's fishing industry, but also radically changed the scales of exploitation in the Straits of Melaka and beyond.

The rise of Chinese fishing villages

As early as the 1870s, Chinese settlers began to establish fishing villages (*bagans*) among the estuaries of the Straits of Melaka, transforming this storied waterway into one of the most important fishing grounds in the world.[11] On the British side of the Straits, Hainanese migrants founded communities on Pulau Ketam and Pulau Pangkor while Hokkien fishers formed villages at Kuala Kurau and Bagan Luar. These four fishing centres were built within the estuaries (*kualas*) of four great rivers. Ketam was located at the wide opening of the Klang River; Pangkor faced the Manjung River; Kurau was at the mouth of the Kurau River; and, Bagan Luar was established near where the Perai River meets the sea. On the Dutch side of the

8 My use of 'somatic landscape' is borrowed from David Biggs and refers to the energy resources (food fish) that fed the region's productive power. For more on the 'somatic energy regime', see J.R. McNeill, *Something new under the sun: An environmental history of the twentieth-century world* (New York: Norton, 2001), pp. 11–12 and Micah Muscolino, *The ecology of war in China: Henan Province, the Yellow River, and beyond, 1938–1950* (Cambridge: Cambridge University Press, 2015), p. 106.

9 I am greatly indebted to John G. Butcher for his boundless generosity and indispensable scholarship on the historical marine fisheries of Southeast Asia, including his early work on belachan and Bagan Si Api Api.

10 In the 1920s and 1930s, Bagan was frequently described as the 'tropical Bergen' in the Dutch and Indies press because it rivalled — in terms of total tonnage produced — the Norwegian fishing port. See 'Visscherijbedrijven in Ned.-Indie', *Algemeen Handelsblad*, 6 May 1932, p. 9; and 'Pandelingschap in Ned.-Indie', *Algemeen Handelsblad*, 7 Feb. 1931, p. 7. See also 'Iets over de Rokanlanden', *Sumatra Post*, 25 Feb. 1924, p. 13; 'Productiecijfers van Bengkalis', *Sumatra Post*, 22 July 1924, p. 10; 'De Eerste of de Tweede?', *Bataviaasch Nieuwsblad*, 19 Mar. 1928, p. 1; 'Millions of fish', *Brisbane Courier*, 20 July 1932, p. 15; and '"Bagan" de Groote Visch-haven', *De Telegraaf*, 8 Dec. 1934, p. 10.

11 On the history and importance of Chinese fishing villages within the Straits, see the invaluable work of John Butcher. In particular, Butcher, *The closing of the frontier*, pp. 80–82; J.G. Butcher, 'The salt farm and the fishing industry of Bagan Si Api Api', *Indonesia* 62 (1996): 90–121.

Straits, Hokkien migrants founded fishing villages on Pulau Seneboie and Pulau Halang Besar, and at Panipahan and Bagan. While the heart of these fishing centres was Bagan, they all shared a home within the vast estuary of the Rokan River.

The rise of these Chinese fishing villages was tied to changes in the lands surrounding the Straits. With the consumption of beef and pork either economically out of reach or culturally prohibited, an abundant supply of fish was needed to provision the swelling masses who populated the mines, plantations, and cities of island Southeast Asia.[12] The estuaries of the Straits proved to be well-positioned to meet the expanding food needs of society and industry. Not only were these brackish waters exceptionally rich in faunal density, but they were also in close proximity to the region's major markets and distribution points. By the early twentieth century, and in the wake of continued infrastructural improvements, overlapping networks of ships, rails, roads, ports, lorries, and sampans easily linked these Chinese fishing villages to the livestock and people who consumed their fishery products.[13] In the interwar years, for instance, Pulau Pangkor's *kembong* (mackerel, *Rastrelliger* spp.) industry fed the tin mines and rubber estates that marked the interior of Perak.[14]

Like Perak's miners and tappers who had regular access to kembong, working people across Sumatra, Malaya, Singapore, Java, and Borneo relied on a variety of food fish captured from the estuaries of the Straits. In addition to Pangkor's kembong industry, the island was a well-known producer of *ikan bilis* (anchovy, *Stolephorus* spp.).[15] On Java, these species of anchovy were called *ikan teri* (with the most popular species being *Stolephorus baganensis*), and they constituted an important source of cheap animal protein for both rural and urban populations.[16] Following an inspection of fish markets in Semarang and Surabaya in 1939, a French colonial official reported that teri was, indeed, the cheapest fish available.[17] South of Pangkor was Ketam, where

12 For an excellent example of fish as commodity in colonial mainland Southeast Asia, see Nola Cooke, 'Tonle Sap processed fish: From Khmer subsistence staple to colonial export commodity', in *Chinese circulations: Capital, commodities, and networks in Southeast Asia*, ed. Eric Tagliacozzo and Wen-Chin Chang (Durham, NC: Duke University Press, 2011), pp. 360–79.

13 For example, in 1931, supplies of ikan busok were exported from Bagan to feed pigs in Melaka. See 'Een Chineesche Kolonie', *Sumatra Post*, 5 Sept. 1931, p. 6. B.J. Haga, colonial controleur at Bagan (1915–17), noted that poor quality ikan busok was used as pig feed and that of higher quality was consumed by people: B.J. Haga, 'De Beteekenis der Visscherij Industrie van Bagan Api Api en Hare Toekomst', *Economist* 66, 1 (1917): 242. According to the Director of Fisheries in colonial Malaya, C. Boden Kloss, about 75% of Chinese fishers raised pigs. See 'Report on the Fisheries Department for the Year 1920', *Supplement to the F.M.S. Government Gazette, July 1, 1921* (Singapore: GPO, 1921), p. 3.

14 See 'Appendix A: Report on the kembong fishery of the West Coast', *Annual Departmental Reports of the Straits Settlements for the Year 1937, vol. 1* (Singapore: GPO, 1938), p. 576; K. Gopinath, 'The Malayan purse seine (pukat jerut) fishery', *JMBRAS* 23, 3 (1950): 75–96; and Marion Ward, 'Malayan fishing ports and their inland connections', *Tijdschrift voor Economische en Sociale Geografie* 55, 5 (1964): 114.

15 See J.D.F. Hardenberg, 'Some remarks on the genus Stolephorus Lacepede in the Indo-Australian archipelago', *Treubia* 14 (1932–34): 313–75.

16 See Masyhuri, 'Pasang surut usaha perikanan laut tinjauan sosial-ekonomi kenelayanan di Jawa dan Madura, 1850–1940' (PhD diss., Vrije Universiteit, 1995), p. 27. On recipes that called for ikan bilis, see *Pengatahoean tentang restaurant Tionghoa, berbagi-bagi industrie dan pemiaraan heiwan* (Semarang-Batavia: Boekhandel Ho Kim Yoe, 1937).

17 F. Maron (?), 'Le commerce du poisson sec aux Indes Neerlandaises', *Bulletin Economique de L'Indochine* 42, 2 (1939): 373. See also 'Pasarprijzen', *Sumatra Post*, 27 Apr. 1925, p. 10; 'Pasarprijzen', *Sumatra Post*, 4 Oct. 1926, p. 8; 'Gedroogde Visch', *Sumatra Post*, 2 Apr. 1927, p. 8;

a community of Hainanese fishers specialised in the production of *ikan asin* (salted fish) and belachan.[18] Another leading centre of belachan production was Bagan Luar, a Hokkien fishing village located north of Pangkor and across from Penang.[19]

Belachan, known as *terasi* (trassie) in the Netherlands Indies, was a staple among the working poor (fig. 1). As a basic and essential commodity, it was popularly consumed either topped on rice (or paired with it), fried with vegetables, or used in curries.[20] It is quite possible that eating belachan with rice and *kangkung* (*Ipomoea aquatica*) was the only accessible way for most of the region's labouring masses (tappers, miners, peasants, peddlers, porters, pullers, and woodcutters) to consume some source of animal protein on a daily basis.

But no estuary mattered more to the regional production of belachan, fish, and prawns than the mouth of Sumatra's Rokan River. Linked to Singapore, Penang, Borneo, Medan, and Java by way of the Koninklijke Paketvaart-Maatschappij (KPM) shipping line and Chinese- and Arab-owned steamers, this once sparsely inhabited estuary became a bustling site of industrial fishery exploitation in the early twentieth century. At the heart of the Rokan estuary and the rise of its modern economic importance was Bagan, the Hokkien-built fishing village that turned this muddy river mouth into an indispensable source of food, feed, and fertiliser.[21]

'A piece of China in the Netherlands Indies'

On the fifteenth and sixteenth days of the fifth month in the Chinese lunar calendar, there occurs a festival in Bagan called Bakar Tongkang (Boat Burning) or Go Ge Cap Lak.[22] This festival commemorates the arrival of the city's first Hokkien settlers who, according to local accounts, came from Songkhla, Thailand.[23] It is an

'Pasarprijzen', *Sumatra Post*, 27 Jan. 1930, p. 11; 'Pasarprijzen', *Sumatra Post*, 22 Dec. 1941, p. 8; and 'Problemen rond het Huishoudboekje', *Nieuwsblad voor Sumatra*, 6 Nov. 1948, p. 3.

18 See the petition from Pulau Ketam's Chinese fishers to Port Swettenham's Harbormaster about their belachan industry, 22 Mar. 1905, file no. 1690/1905, National Archive of Malaysia (NAM), Kuala Lumpur; and their petition to the same Harbormaster about the cost of producing belachan, 21 Apr. 1908, file no. 2239/1908, NAM.

19 'Cheaper and better food', *Malaya Tribune*, 8 May 1924, p. 7; and J. Westenberg, 'Fishery products of Indochina: A compilation of literature up to the Japanese invasion', *Proceedings of the Indo-Pacific Fisheries Council* 2, 2 (1950): 133–4.

20 'Belachan trade', *Singapore Free Press and Mercantile Advertiser*, 27 Sept. 1924, p. 12; 'Tropical recipes', *Malaya Tribune*, 6 Aug. 1932, p. 13; 'Manufacture of blachan', *Straits Times*, 24 Feb. 1937, p. 13; '$788 front: Belachan', *Straits Times,* 15 Oct. 1953, p. 5; and 'Mari-lah kita masak sayor lemak bayam dan keledek', *Berita Harian*, 4 May 1959, p. 6.

21 For a sense of the scale of belachan production at Bagan in the early twentieth century, see Haga, 'De Beteekenis der Visscherij', p. 240. As a colonial officer, Bauke Jan Haga (1890–1943) had an intimate knowledge of Bagan, its fishing industry, and the surrounding Rokan ecology because he had served on the Sumatra side of the Straits from 1913 to 1917—with an important post as the controleur at Bagan Si Api Api from 1915 to 1917. From 1937 to 1942, Haga held positions as the resident of Maluku and governor of South and East Borneo. During the Japanese Occupation, Haga was interned (along with his wife) in Banjarmasin, and died during a foiled prison break attempt in 1943. For more on Haga's death, see Ooi Keat Gin, *The Japanese Occupation of Borneo, 1941–1945* (New York: Routledge, 2011), pp. 103–4.

22 The Dutch controleur at Bagan, J.C.C. Haar, described this festival, referring to it as a ceremony, in the 1930s. See Memorie van Overgave van Bagan Si Api Api, 1934–1936, Ministerie van Kolonien: Memories van Overgave, No. 869, Nationaal Archief, The Hague (NA), p. 28.

23 Zuli Laili Isnaini, 'Go Cap Lak: Ritual dan identitas baru etnis Tionghoa di Bagansiapiapi', *Media Wisata* 7, 1 (2012): 5–6.

Figure 1. Men making belachan, Bengkalis (Sumatra), n.d. Collection Nationaal Museum van Wereldculturen. Coll.no. TM-10002866.

annual spectacle that attracts observers and participants, many of whom are Hokkien, from areas within and beyond the Straits such as Medan, Melaka, Singapore, Penang, and Hong Kong. On the first day of the festival, these attendees gather at the In Hok Kiong Temple (built in 1875), where they pray and make offerings to the sea spirit Kie Ong Ya (Ong Jah Kong).[24] On the second day of the festival, participants parade through town a large, paper-made boat, representing the *tongkang* that brought the group of Hokkien settlers to the Rokan estuary. The procession concludes near the shoreline, where the large *tongkang* is set on fire with festival goers paying close attention to the boat's tall mast.[25] The direction in which it falls will determine the upcoming year's fortunes.

Not unlike other estuaries in the Straits of Melaka, the mouth of Sumatra's Rokan River made it possible for a community to take root and thrive as a centre of fishery production. Demographically, the Rokan estuary was lightly populated in the late nineteenth century. While a few Malay kampongs were located upstream around

24 See Ely Sovita, 'Perubahan makna tradisi perayaan Bakar Tongkang pada masyarakat Tionghoa di Kota Bagansiapiapi' (MA thesis, Universitas Sumatera Utara, 2012), p. 2; Swis Tantoro, 'Makna simbolik tradisi Bakar Tongkang (Go Ge Cap Lak) di Kabupaten Rokan Hilir' (Pekanbaru: Universitas Riau, 2013); and Welly Wirman et al., 'Etnografi komunikasi tradisi Bakar Tongkang (Go Ge Cap Lak) di Kabupaten Rokan Hilir', *Jurnal ASPIKOM* 3, 5 (July 2018): 846–59.

25 See Rony Muharram (Anatara Foto), 'Ritual Bakar Tongkang Rokan Hilir', https://tirto.id/bnUP (accessed 20 June 2018).

Tanah Putih and under the jurisdiction of the Sultan of Siak, there were faint signs of human settlement or economic activity within the actual zone of the Rokan river mouth.[26] It was here among the mudflats, tidal bores, and mangrove forests that Hokkien migrants arrived in the 1870s.[27] A few years later, in 1884, the population of Bagan was a little over 900, consisting of about 800 Hokkiens, 90 Teochews, and 30 Hainanese, with the Hokkiens maintaining an active clan association.[28] By 1909, however, the population had increased to more than 10,000 residents, nearly all of them Chinese and mostly Hokkien fishers.[29] As one observer put, Bagan was 'a piece of China in the Netherlands Indies' (fig. 2).[30]

With the economic life of a 'Chinese city', Bagan was distinct and dynamic.[31] Made from local peat soil, Bagan's streets were named after places such as Macau and teemed with culture and commerce.[32] They were lined with medicine shops, coffeehouses, and gas lamp posts.[33] Hawker stalls sold *bami* (noodles), people sat on little stools eating with chopsticks, and children bought Chinese sweets and shaved ice (coloured with syrup). *Tukang gigi* (dentists) plied their trade 'in the open air of the night' while vendors peddled 'fine false dentures and artificial teeth', laid out nicely on colourful Chinese paper. Other stalls made a business out of marketing portraits of the era's most famous Chinese film stars. Finally, rickshaws animated Bagan's streets, as did the nightly sounds of Chinese music, coming from gramophone records and wayang performances ('a kind of variety cinema'). Fuelling Bagan's cultural and economic life was the Rokan estuary and the fishing industry it supported.

Bagan's fishing industry

For Bagan's fishing industry, it was the scale of production that mattered most as demands for fishery supplies swelled across island Southeast Asia in the wake of the nineteenth century. From Singapore to Java, there was a hunger for cheap and abundant sources of animal-based protein, and Bagan's fishing industry positioned itself to meet the needs of these growing markets.[34] As a result, Bagan produced more fishery products than almost any other place in the early twentieth century. In 1909, for example, the Hokkien-built village ranked second in the world in terms of tonnage

26 P.N. van Kampen, 'Aanteekeningen omtrent de Visscherij van Sumatra en Riouw', *Mededeelingen van het Visscherij-Station te Batavia* 3 (1909): 7; J.A. van Rijn van Alkemade, 'Beschrijving eener Reis van Bengkalis Langs de Rokan-Rivier naar Rantau Binoewang', *Bijdragen tot de Taal-, Land- en Volkenkunde* 32, 1 (1884): 26; and G. Masset, 'Het Visscherijbedrijf te Bagan si Api-Api', *Volkscredietwezen* (Oct. 1936): 126.

27 On the arrival of Hokkiens in the 1870s, see J.L. Vleming, *Het Chineesche Zakenleven in Nederlandsch Indië door den Belasting Accountants Dienst onder leiding van J.L. Vleming* (Weltevreden: Landsdrukkerij, 1926), p. 234.

28 Alkemade, 'Beschrijving eener Reis', p. 30. There were also a small number of 'Keh-Chineezen'.

29 'Bagan Api Api', *Sumatra Post*, 30 June 1909, p. 1.

30 See 'Een Stuk China in Nederlandsch-Indie', *Niuewsblad van het Noorden*, 14 Nov. 1930, p. 13.

31 'Een Chineesche Kolonie', *Sumatra Post*, 5 Sept. 1931, p. 6.

32 The following details of street life are drawn from the account found in: 'Een Chineesche Kolonie', *Sumatra Post*, 5 Sept. 1931, p. 6. On street names, see Haga, 'De Beteekenis der Visscherij', p. 239. On peat soil, see *Weekblad voor Indie* 17, 5, 9 May 1920, p. 70.

33 On urban lighting, see J. Moerman, *In en om de Chineesche Kamp* (Weltevreden: Landsdrukkerij, 1929), p. 20.

34 See 'Bagan Si Api Api', *Bataviaasch Nieuwsblad*, 6 Nov. 1915, p. 1.

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Figure 2. Chinese School, Bagan, 1934. Collection Nationaal Museum van Wereldculturen. Coll.no. TM-60051199. Photograph by C.H. (Christoffel Hendrik) Japing.

of fish exported; it was eclipsed only by Bergen — the Norwegian city that had 20,000 inhabitants (twice the size of Bagan's population), a long history of fishing and seafaring, European capital and technology, and a cold climate 'extremely favorable' to fish preservation.[35] And while climate favoured Bergen's production and storage of herring and cod, among other economic species, it posed a perennial challenge to Bagan's fishing industry and other Chinese fishing villages in the Straits of Melaka. In contrast to Norway and northern Europe, violent rains and endless downpours were seasonal realities for Bagan and the rest of monsoon Asia, causing complications not just for capturing food fish, but especially for the process of drying them for mass consumption (in the form of belachan and salted fish, which were the major fishery products of Bagan and the Straits more generally).[36] Yet despite these trying climatic conditions, Bagan still produced an annual average of nearly 30 million kilograms of fish and belachan from 1898 to 1928.[37] By the mid-1920s and 1930s, Bagan's status as the world's second largest fishing port was widely reported.[38] One local newspaper

35 'Bagan Api Api', *Sumatra Post*, 30 June 1909, p. 1.
36 Ibid.
37 C.J. Bottemanne, *Verslag over de Visscherij en Vischhandel van Bagan Si Api-Api* (Batavia: Instituut voor de Zeevischerij, 1929[1941]), p. 12.
38 Bagan's boom, however, also caused a surge in local opium consumption. See 'Increased opium

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even referred to Bagan as the 'tropical Bergen'.[39] In 1934, Bagan even topped Bergen, producing a total of 46 million kilograms of fish and belachan.[40]

Facilitating Bagan's career as a global centre of fishery production were improved networks of communication, transport, and other forms of infrastructure. In October 1916, a telegraphic cable was laid, connecting Bagan to Tanjung Balai (near Medan) and enabling Bagan's fishing industry to 'keep abreast of fluctuations in prices of foreign markets'.[41] Likewise, a lighthouse was maintained at the mouth of the Rokan River to ensure not only the safe import of salt from Aden, Singapore, Madura, and Siam, but also the equally safe export of Bagan's principal fishery products — salted fish, *ikan busok* ('rotten fish'), belachan, and dried prawns and prawn shells.[42] Finally, the expansion of steamship lines and sampan services increased the scale of shipped cargo while widening the circuit of distribution.[43]

In addition to the all-important KPM routes, Bagan benefited from the radials of local shipping firms such as the Wee Brothers Steamship Co. Founded in 1911 by Wee Leong Tan (also known as Oey I Tam), the Wee Brothers operated cargo routes that connected Bagan to Singapore, Batavia, Cheribon, Tegal, Semarang, and Bengkalis (figs. 3, 4).[44] And working in the wake and shadows of the Wee Brothers and KPM were smaller, wind-powered sampans and tongkangs that plied the

smoking', *Straits Times*, 1 Oct. 1934, p. 12. For more on Bagan as the second largest fishing port, see 'Iets over de Rokanlanden', *Sumatra Post*, 25 Feb. 1924, p. 13; 'Productiecijfers van Bengkalis', *Sumatra Post*, 22 July 1924, p. 10; 'De Eerste of de Tweede?', *Bataviaasch Nieuwsblad*, 19 Mar. 1928, p. 1; 'Millions of fish', *Brisbane Courier*, 20 July 1932, p. 15; '"Bagan" de Groote Visch-haven', *De Telegraaf*, 8 Dec. 1934, p. 10; and 'Ons Indiche Hoekje', *Oprechte Haarlemsche Courant*, 11 June 1941, p. 8.

39 'Visscherijbedrijven in Ned-Indie', *Nieuws van den dag voor Nederlandsch-Indie*, 2 Aug. 1926, p. 9.

40 'Bagan Si Api Api weer No. 1', *Indische Courant*, 2 Oct. 1934, p. 6. See further Memorie van Overgave van Bagan Si Api Api, 1934–1936, Ministerie van Kolonien: Memories van Overgave, No. 869, NA, p. 76.

41 'Telegraafkabel Tdj. Balai-Bagan Si Api Api', *Sumatra Post*, 19 Aug. 1916, p. 10. See 'Bagan Si Api-Api', *Sumatra Post*, 1 Mar. 1918, p. 9.

42 On the lighthouse and its maintenance, see *China Sea Pilot, vol. 1* (London: Hydrographic Office, 1916), p. 123; 'Light burning', *Straits Times*, 6 Feb. 1934, p. 3; 'Singapore Harbour Board', *Straits Times*, 10 Jan. 1935, p. 3; 'Rokan River Light', *Malaya Tribune*, 1 Mar. 1935, p. 6; and 'Rokan River Light', *Malaya Tribune*, 19 Mar. 1936, p. 6. For more on the role of salt in Bagan's fishing industry, see Butcher, 'The salt farm', pp. 90–121. On the geography of the salt trade (and salt as contraband), see 'Zoutbelasting ter Oostkust', *Sumatra Post*, 31 Jan. 1906, p. 6. See also B. Markus, *Visscherij Methoden en Vischproducten van Bagan Si Api-Api* (Batavia: Instituut voor de Zeevisscherij, 1929 [1941]), p. 19; Van Kampen, 'Aanteekeningen omtrent de Visscherij', pp. 14–15; and L. Tip, 'Het Chineesche Visscherijbedrijf te Bagansiapiapi', *Indie* 8 (1924–25): 307.

43 'Oost van Sumatra: De Veeteelt', *Mededeelingen van het Bureau voor de Bestuurszaken der Buitenbezittingen* 2, 3 (July 1919): 88. With cargo shipping on the rise, increased traffic also meant increased risk as the waters in the Straits of Melaka were still treacherous because of weather, reefs, and pirates. See 'Untitled', *Straits Times*, 26 Sept. 1922, p. 8; 'Zeeroovers in Bengkalis', *Sumatra Post*, 19 Mar. 1924, p. 10; 'De Zeeroverij in de Straat van Malakka', *Indische Courant*, 31 July 1924, p. 9; 'Zeeroover op Vrije Voeten gesteld', *Nieuws van den dag voor Nederlandsch-Indie*, 4 Feb. 1931, p. 3; 'Runs aground', *Straits Times*, 20 Nov. 1933, p. 3; and 'Pirates in Selangor', *Singapore Free Press and Mercantile Advertiser*, 21 Mar. 1935, p. 6; 'Zeeroverij in de Straat van Malakka', *Nieuws van den dag voor Nederlandsch-Indie*, 25 Mar. 1935, p. 2.

44 Van Kampen, 'Aanteekeningen omtrent de Visscherij', p. 9. For more on Wee Leong Tan, see 'The late Wee Leong Tan', *Straits Times*, 19 May 1913, p. 9; Song Ong Siang, *One hundred years' history of the Chinese in Singapore* (London: John Murray, 1923), p. 351; and Butcher, 'The salt farm', p. 99.

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Figure 3. Arrival of cargo boats at the customs office in Bagan, n.d. Collection Nationaal Museum van Wereldculturen. Coll.no. TM-10007941.

Figure 4. Cargo baskets and wooden road, Bagan, n.d. Collection Nationaal Museum van Wereldculturen. Coll.no. TM-10008076.

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Straits of Melaka, shipping fishery products to towns and villages up the coast of Sumatra as well as across the waterway to Melaka and its hinterland.

While infrastructural changes shaped the rise of Bagan in the early twentieth century so did the nature of its multi-species fishery. Bagan's fishing industry was diversified, producing abundant supplies of food, feed, and fertiliser that powered the rapidly changing world of interwar Southeast Asia. In terms of food, Singapore was a major entrepôt for Bagan fishery products.[45]

Dried prawns were sent in baskets to the colonial port city for local consumption, while crates of dried prawns and fish maws were transshipped through Singapore to Hong Kong and Amoy (fig. 5).[46] Steamers carrying nothing but belachan (what the Dutch called 'trassiebooten') also plied the waters between Bagan and Singapore, and from Singapore tons of this essential staple were channelled to smaller, out-of-the-way places such as Rengat (a town in Riau) and Rangsang (an island in Riau).[47] A fleet of belachan-steamers connected Bagan to Java as well, its largest export market.[48]

For rural and urban populations on Java, belachan was an 'indispensable' part of the daily diet.[49] Salted fish and ikan busok were also sent to Java, where cities such as Batavia, Semarang, and Surabaya came to depend on Bagan's production.[50] Similarly, salted fish and belachan were sent to the 'plantation-area of Sumatra', powering the working people (largely Chinese and Javanese migrants) who laboured on tobacco, palm, and rubber estates or in the colonial ports that exported these industrial commodities to overseas markets at unprecedented levels.[51]

By-products of Bagan's fishing industry furnished important trades too. As for feed, Bagan produced the multi-species product called ikan busok that was caught using *djermals* (or jermals, vast V-shaped fishing stakes) and included a mixture of small fish, shrimps, and prawns.[52] While high-quality forms of this commodity were marketed for human consumption, low-quality forms were exported to Chinese-owned pig and duck farms in Pontianak, Singapore, Melaka, and Medan

45 Haga, 'De Beteekenis der Visscherij', p. 240; 'Gouvernement en K.P.M.', *Bataviaasch Nieuwsblad*, 10 Nov. 1921, p. 6; and 'De Visscherij van Bagan Si Api Api', *Sumatra Post*, 5 June 1929, p. 10.

46 Masset, 'Het Visscherijbedrijf te Bagan si Api-Api', pp. 133–4; and 'Bagan Si Api-Api', *Preanger-Bode*, 4 May 1920, p. 5.

47 'De "Ville Lumiere" der donkere Bengkalis-afdeeling', *Sumatra Post*, 28 Oct. 1936, p. 5. A regular fleet of 'trassiebooten', or steamers shipping belachan, circulated between Bagan and Java. See 'Bagan Si Api Api, een Vestiging van Chineezen', *Sumatra Post*, 28 Oct. 1936, p. 5; and D.M., 'Indias', *De Uitlaat* 18, 9 Sept. 1965, p. 7.

48 P.N. van Kampen, *Visscherij en Vischteelt in Nederlandsch-Indie* (Haarlem: H.D. Tjeenk Willink & Zoon, 1922), p. 76.

49 Masset, 'Het Visscherijbedrijf te Bagan si Api-Api', p. 133. See Mizutani et al., 'A chemical analysis of fermented fish products', p. 803; and Butcher, 'The salt farm', p. 97.

50 Willy, 'Een Bloeiend Bedrijf', *Weekblad voor Indie* 17, 5, 4 May 1920, p. 71; and G. Schaap, 'Uittreksels uit de Memorie van Overgave van Het Bestuur over de Residentie Oostkust van Sumatra', *Tijdschrift van het Koninklijk Nederlansch Aardrijkskundig Genootschap* 2 (1907): 30.

51 J.D.F. Hardenberg, 'The fishfauna of the Rokan Mouth', *Treubia* 13, 1 (1931): 81. On Sumatra's plantation boom, particularly around Deli, see Butcher, *The closing of the frontier*, pp. 62–5.

52 The ikan busok catch would be salted wholesale without any cleaning or selection. Fish species commonly caught, processed, and mixed as ikan busok were: gulamah (Sciaenoides spp.), bilis (*Stolephorus baganensis*), biang biang (*Setipinna breviceps*), senangin (*Eleutheronema tetradactylum*), trubuk (*Clupea toli*), and puput (Pellona spp.). See Hardenberg, 'The fishfauna of the Rokan Mouth', p. 159.

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Figure 5. Drying fish and belachan, Bagan, 1925–33. Collection Nationaal Museum van Wereldculturen. Coll.no. TM-10014240.

(Perbaungan).[53] Likewise, prawn shells and fish scales were processed as fertiliser and shipped to pepper and rubber plantations in West Borneo (Kalimantan), Riau, Bangka, the Lampongs, and Deli.[54] In 1929, C.J. Bottemanne, a leading Dutch fisheries economist who founded the Institute for Sea Fisheries at Pasar Ikan (Batavia), reported that exceptionally large shipments of Bagan's prawn shells (totalling about 6.6 million kilograms) were sent across the Straits to Penang, Melaka, Port Swettenham, and Singapore (fig. 6).[55]

But behind the massive scale and rich range of Bagan's fishing industry was the ecology of the Rokan estuary. Several factors explain why the mouth of the Rokan River was uniquely productive as a multi-species fishery. First, and like other estuaries in the Straits of Melaka, the Rokan mouth was a zone where fresh water mixed with saltwater. As a result, the estuary was defined by fluctuations in turbidity, salinity, and clarity, all features that contributed to its rich biological life. These changes were, in part, caused by the shifting seasons. For example, the wet monsoon intensified the flow of fresh water from the Rokan into the Straits of Melaka. On a study visit to the Rokan mouth in 1929, J.D.F. Hardenberg, a Dutch biologist who worked at the Laboratory for the Investigation of the Sea in Batavia, observed that 'in the rainy

53 Masset, 'Het Visscherijbedrijf te Bagan si Api-Api', p. 134; Bottemanne, *Verslag over de Visscherij en Vischhandel*, p. 15; 'De Visscherij van Bagan Si Api Api', *Sumatra Post*, 5 June 1929, p. 10; and 'Een Chineesche Kolonie', *Sumatra Post*, 5 Sept. 1931, p. 6.

54 Markus, *Visscherij Methoden en Vischproducten*, p. 34; Haga, 'De Beteekenis der Visscherij', p. 242; Van Kampen, *Visscherij en Vischteelt in Nederlandsch-Indie*, p. 80; 'Bagan Si Api Api', *Bataviaasch Nieuwsblad*, 6 Nov. 1915, p. 1; 'Een Groote Vischbedrijf in Indie', *Sumatra Post*, 8 May 1916, p. 10; and 'Langs Sumatra's Oostkust', *Nieuws van den dag voor Nederlandsch-Indie*, 2 Aug. 1926, pp. 9–10.

55 Bottemanne, *Verslag over de Visscherij en Vischhandel*, pp. 20–21.

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Figure 6. Boats in harbour and nets drying in the distance, Bagan, 1934. Collection Nationaal Museum van Wereldculturen. Coll.no. RV-A40-1-46.

monsoon, when the river carries down great masses of water, the level of the water may rise much higher, and the whole land be inundated'.[56] Hokkien fishers also learned that the dry monsoon increased the levels of salinity within the estuarine world, resulting in a greater concentration of food fish migrating landward.[57]

Seasonal monsoons also shaped the bathymetry of the estuary and the wealth of its food web. That is, heavy rains carried not only masses of water down the Rokan, but also masses of silt (built up during the dry monsoon) and nutrient-rich organic matter. While the silt contributed to the mudbanks that populated the Rokan mouth and its 'colossal expanse', it also replenished the estuary's 'sludgy' bottom, forming a habitat that was preferred by a number of economic species.[58] For instance, certain kinds of gobies (*Gobiidae*) thrived in the mud, constituting in some parts of the Rokan mouth between 75 to 85 per cent of the djermal catches.[59] And as the flow and quantity of silt and mud increased with the rainy season, so did the scale and area of gobies production. For Bagan, these fish formed a valuable export as pig feed. Food fish that were processed as ikan busok similarly favoured the muddy

56 Hardenberg, 'The fishfauna of the Rokan mouth', p. 83. Hardenberg was director of the Laboratory from 1933 until the late 1950s. He was also a founding member of the Indo-Pacific Fisheries Council (established in 1948). Hardenberg served as chair of the Council from 1950 to 1951.
57 Ibid., p. 140.
58 Bottemanne, *Verslag over de Visscherij en Vischhandel,* p. 3.
59 Hardenberg, 'The fishfauna of the Rokan mouth', p. 143.

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bottom of the Rokan mouth.[60] And along with mud and silt pouring into the Rokan estuary, the monsoon rains also facilitated the movement of extraordinary amounts of nutrient-rich organic matter. The scale of nutrient deposit fed fantastic blooms of phytoplankton, which formed the base of the Rokan's rich estuarine food web.[61]

With high levels of mud, nutrients, and phytoplankton, the Rokan mouth supported a dense ecology of aquatic life rather than a diverse one. In studying the Rokan estuary in 1929, Hardenberg identified 149 fish species, and among these only 50 to 60 were common.[62] In 1951, Hardenberg updated his species count to 175, explaining that while poor in species, the Rokan mouth was rich in individuals.[63] The rise of Bagan and its industrial fishery was partly powered by the Rokan mouth's faunal density, but also by the fact that most of its economic species spent their whole life-cycle within the contours of the estuary.[64]

While density over diversity was indeed an important feature of the Rokan estuary, nothing was more central to the scale of Bagan's fishing industry than the tides and currents of the Straits. As early as 1908, P.N. van Kampen, a Dutch zoologist who had spent two months investigating the fishery resources of the Straits of Melaka (as part of the Indies research vessel *Gier*), reasoned that Bagan's fishing industry excelled because of the Rokan's strong tidal flows.[65] In 1917, B.J. Haga came to the same conclusion. As the Dutch controleur at Bagan from 1915 to 1917, Haga was invested in the fishing industry because of the tax revenue it generated. From his observations, he argued that not only were the strong currents of the Rokan mouth the reason for the exceedingly large catches, but that 'the strong current [was] in fact the main tool … the main factor'.[66] Drawing on his field visits to the Rokan mouth, Hardenberg similarly explained that Bagan's industrial production of food, feed, and fertiliser depended on the tides of the estuary and their remarkable rapidity.[67] In fact, the currents changed so swiftly and intensely that they formed whirlpools and tidal bores.[68]

Harnessing these shifting tides and changing currents was Bagan's fishing industry and its vast sea of djermals and *ambais*. On his investigations in 1908, van

60 Ibid., p. 151.

61 J.D.F. Hardenberg, *Onderzoek en Problemen der Indische Zeeen* (Batavia: Departement van Landbouw en Visserij, 1949), p. 19.

62 Hardenberg, 'The fishfauna of the Rokan mouth', pp. 98–9.

63 J.D.F. Hardenberg, 'Estuarine problems in South East Asia', *Proceedings of the Indo-Pacific Fisheries Council* 2, 3 (1951): 178.

64 J.D.F. Hardenberg, 'The existence of an aestuarine fishfauna in South East Asia', *Bijdragen tot de Dierkunde* 28, 1 (1949): 165.

65 Van Kampen, 'Aanteekeningen omtrent de Visscherij', p. 7. Pieter Nicolaas van Kampen (1878–1937) finished his PhD in zoology at the University of Amsterdam in 1904 under the mentorship of Max Wilhelm Carl Weber, and worked at the Fisheries Station in Batavia from 1905 to 1911 (serving as its director in 1911). After contracting an illness on a New Guinea expedition in 1910, van Kampen returned to Amsterdam and taught zoology. He was a professor of zoology at Leiden University from 1917 to 1931. One of his most important publications was *Visscherij en Vischteelt in Nederlandsch-Indie* (Haarlem: Willink & Zoon, 1922).

66 Haga, 'De Beteekenis der Visscherij', p. 241.

67 Hardenberg, 'The fishfauna of the Rokan mouth', p. 84.

68 K.J. Boeijinga, 'De Visscherij van Bagan Api Api', *Koloniaal Tijdschrift* (Sept. 1926): 451–2. See also D.A. Rinkes, N. van Zalinge and J.W. de Roever, *Het Indische Boek der Zee* (Batavia: G. Kolff & Co., 1925), p. 151; and 'De Moderniseering van de Zeevisscherijen van Nederlandsch Oost-Indie', *Nieuwe Rotterdamsche Courant*, 28 May 1925, p. 1.

Kampen reported that djermals were 'everywhere along the coasts of the Straits of Melaka' and in the Rokan estuary, while 'difficult to estimate accurately, certainly a few hundred'.[69] Originally a Malay design that Hokkien fishworkers adopted, the djermal became an industrial device in terms of its size and scope of capture. Built of mangrove poles and nearly 2,500 mangrove stakes, the djermal was constructed out in the mouth (up to three fathoms deep) and anchored in the mud.[70] It took the shape of a large V with a wide, thin screen and net made entirely of rattan to catch all that the currents carried (figs. 7, 8).[71]

'With the djermal,' explained van Kampen, 'everything is captured'.[72] By 1929, these already large, fishing devices (so dependent on mangrove products) had become even more industrial in size, leading C.J. Bottemanne to describe them as 'monster djermals'.[73]

But the massive design and effective use of these technological devices rested upon a wealth of local knowledge about the tides and currents within the Rokan mouth. That is, Hokkien fishworkers had to position their djermals so that as the tides went out, all forms of life, big and small, mature and fry, edible and poisonous, were swept into the screens of the nets by the swift currents.[74] While the djermals remained stationary, planted in the estuary, the fishers would lift their screens and collect their catch of fish, shrimp, prawns, and anything else that the currents carried. The ambai worked in a similar fashion, though with fewer mangrove products and a finer-meshed net. However, there was one major difference between the two: the ambai was designed to fish in tides that were both incoming and outgoing, thereby maximising the rate of production.[75] With their flexibility and finer-meshed nets, ambais soon proved dangerously effective in catching tons of shrimp (*Acetes* spp.), fish fry, and young prawns that were then quickly salted, processed, and prepared for export as belachan. For Bagan fishers working in the early twentieth century, the tides and currents of the Rokan mouth were forces of fortune just as much as they were forces of nature. And by harnessing these forces through knowledge and technology, Bagan and its fishers were able to transform not only the economic importance of the Straits of Melaka, but also the economic life of island Southeast Asia.

Conclusion: Old waters, new currents

For Bagan, the edible tide was central to provisioning the rapid growth of cities, plantations, and mines in the decades between the late nineteenth century and the end of the interwar period. Located at the mouth of Sumatra's Rokan River, this Hokkien-built town played a critical role in converting the brackish borderlands of the Straits of Melaka into one of the world's most important prewar fishing grounds. At the heart of this epic transformation were southern Chinese migrants who

69 Van Kampen, 'Aanteekeningen omtrent de Visscherij', p. 9.
70 Butcher, 'The salt farm', p. 110; and van Kampen, 'Aanteekeningen omtrent de Visscherij', p. 9.
71 Markus, *Visscherij Methoden en Vischproducten*, pp. 2–3; and Haga, 'De Beteekenis der Visscherij', p. 241.
72 Van Kampen, 'Aanteekeningen omtrent de Visscherij', p. 12.
73 Bottemanne, *Verslag over de Visscherij en Vischhandel,* p. 4.
74 Hardenberg, 'The fishfauna of the Rokan mouth', p. 84; and Butcher, 'The salt farm', p. 94.
75 Butcher, 'The salt farm', p. 96.

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Figure 7. Drying fishing net and making rattan screen, Bagan, 1900–40. Collection Nationaal Museum van Wereldculturen. Coll.no. TM-10013496.

Figure 8. Djermal off the coast of Bagan, *c.*1939. Collection Southeast Asian & Caribbean Images (KITLV), Leiden University Libraries. Coll.no. KITLV 83986. Licensed under CC BY 4.0

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combined environmental knowledge with Malay technology (using rattan, mangrove, bakau, and other plant materials in the construction of djermals, ambais, and drying platforms) to produce new and abundant supplies of industrial fish such as ikan asin, ikan busok, and belachan. In the wake of the nineteenth century, urban and rural populations of island Southeast Asia came to depend on the productivity of estuaries and migrants alike.

But by the 1940s, a new world was taking shape in the Straits. Some Chinese fishing villages became suspect in the eyes of ethno-nationalists. In the case of Bagan, clashes erupted between Hokkien fishworkers and 'Indonesian extremists' in 1946, resulting in the deaths of hundreds of Chinese and thousands of them fleeing through kin networks to Singapore, Melaka, Kuala Selangor, and Pulau Ketam.[76] These clashes were devastating to Bagan's fishing industry and the regional supply of food fish. Between May and September in 1946, steamers shipping fishery products from Bagan to Singapore and other ports were periodically detained, and in some cases repurposed by the Indonesian Navy (at great losses to local shipping firms).[77] Consequently, Singapore's fish supply was cut by almost 20 per cent, prompting the colonial port-city to look beyond the political dangers that troubled the Straits and exploit, instead, the unguarded waters of the South China Sea and the Bay of Bengal.[78]

Technologically, these postwar currents of fishery exploitation were a sharp departure from the prewar days of djermals, ambais, and other capture devices built from plant-based materials. In contrast to this earlier moment, the postwar period was marked by the spread of diesel engines, fish finders, nylon nets, refrigerated containers, and geopolitics. And while this new era's scale, scope, and speed were unprecedented in Southeast Asian waters, so too was the regional demand for food fish — driven largely by the rise of local megacities such as Jakarta. Yet Bagan and other Chinese fishing villages were by no means cast aside by these postwar currents or left behind by its technological innovations. In fact, Bagan would mobilise its capital and connections to be the first to introduce shrimp trawlers in Indonesian waters, using them to exploit the Rokan estuary in 1966 much like it had with the expansion of Malay capture technologies just over a half-century before.[79] Indeed, by looking at

76 Violence first started in early 1946. An eyewitness, Mr Ng Tok Kek, reported that on the anniversary of Sun Yat-sen's death (Mar. 12), clashes broke out over the raising of the Chinese national flag between Bagan residents and a 'gang of Indonesian extremists', despite Republican authorities having granted permission to Bagan to hoist the flag and commemorate the anniversary. The violence resulted in the death of the Chinese kapitan and 17 Indonesians. See 'Indonesian–Chinese clash in Sumatra', *Sunday Tribune*, 17 Mar. 1946, p. 4; and Remco Raben, 'Anti-Chinese violence in the Indonesian Revolution', paper presented at the conference, 'Dekolonisasi dan posisi etnis Tionghoa Indonesia, 1930s–1960s', Padang, Indonesia, 18–21 June 2006, p. 4. For events between May and Sept. 1946, see 'Chineesch-Indonesisch incident', *Nieuwe Courant*, 25 Sept. 1946, p. 1; 'Bagan Api Api fisherfolk to settle here', *Straits Times*, 10 Oct. 1946, p. 5; 'Chinese evacuate Api Api', *Singapore Free Press*, 10 Oct. 1946, p. 5; and 'Bagan-Siapi-Api: Staat in een Staat', *Locomotief*, 8 Jan. 1949, p. 2.

77 'Ho Hong ship detained by Indonesians', *Straits Times*, 15 Oct. 1946, p. 5.

78 'Singapore fish supply cut', *Singapore Free Press*, 13 Dec. 1946, p. 1; and 'Chinese fishermen turn to Andamans', *Straits Times*, 8 Oct. 1946, p. 3.

79 M. Unar, 'A review of the Indonesian shrimp fishery and its present developments', *Marine Fisheries Review* 36, 1 (Jan. 1974): 21. See also A. Dwiponggo, 'Indonesia's marine fisheries resources', in *Indonesian marine capture fisheries*, ed. C. Bailey, A. Dwiponggo and F. Marahudin (Manila: International Center for Living Aquatic Resources Management, 1987), pp. 21–2.

the life and afterlife of Bagan, this article has tried to bring into focus the processes of production and provisionment, explaining how they happened, why they mattered, and the role estuaries and migrants played in transforming the Straits of Melaka into an industrial fishing zone.