

PART II

The Crystallization of the Pattern

THE CLASSICAL PERIOD

How has this uneven distribution come about? Why is virtually all of the nation's swidden found today in Outer Indonesia and more than three-quarters of her sawah concentrated in the inner core of northwest, east, and central Java, south Bali and west Lombok?¹ What factors shaped this peculiar pattern of land use in the first place and what factors acted upon that pattern from outside, complicating it, solidifying it and forcing it into its present untractable, overdriven state? What is the ecological history of the ossification of the Indonesian agrarian economy?

The flourishing of wet-rice agriculture on Java (since before the Christian era) has generally been explained by a happy combination of, as the Dutch geologist Mohr put it, the four elements of the ancient world: fire, water, earth and air.² The "fire" is provided by the intense volcanic activity of the more than thirty working cones, which run lengthwise down the middle of the island and supply the plant nutrients which the otherwise thin

soils lack. The "water" comes from the short, quick-running, silt-laden rivers cradled between these cones which, draining one way or another from the central range, carry the minerals it produces southward toward the Indian Ocean or northward toward the Java Sea. The "earth" is represented by the well-drained, gradually sloping, enclosed-plain relief formed by the basins of these intermountain rivers which creates a series of well-defined natural amphitheatres eminently suited to traditional gravity-feed irrigation techniques. And the "air" is an outcome of the moderately humid climate intermediate between the continual rainfall of equatorial Sumatra, Borneo, Celebes, and the Moluccas and the sharp biseasonality of the monsoonal Lesser Sundas, a tropical compromise which avoids both the swamping and intense leaching of the islands to the north and west and the excessive drying and wind erosion of those to the south and east. Traditionally at least, Java (with Bali and Lombok) has formed not one huge continuous, dead flat river-plain rice belt, as, say, central China or northwest India, but a number of separate, gently rounded pockets of intense cultivation—a set of small-scale, richly alluvial galleries hemmed in by volcanic mountains or unirrigable limestone hills.³

(See Map 2.)

With the partial exception of the Agam and Toba regions of central and north Sumatra, such nicely appropriate landscapes for wet-rice cultivation do not exist in the Outer Islands. Sumatra is sharply divided into precipitous western highlands and spongy eastern swamp; Borneo is poorly drained on the coast, covered with broken hills in the interior; Celebes is mountain-crowded, with few sizable lowland areas; the Moluccas are fragmented and very wet, the Lesser Sundas fragmented and, in the summer monsoon, very dry. Sumatra has some active volcanoes, but most of them throw off acidic rather than basic ejecta and so impover-

¹ The swidden distribution is apparent from mere inspection; the sawah proportions are calculated from Statistical Pocketbook of Indonesia, 1957, pp. 46-49.

² Mohr, 1946.

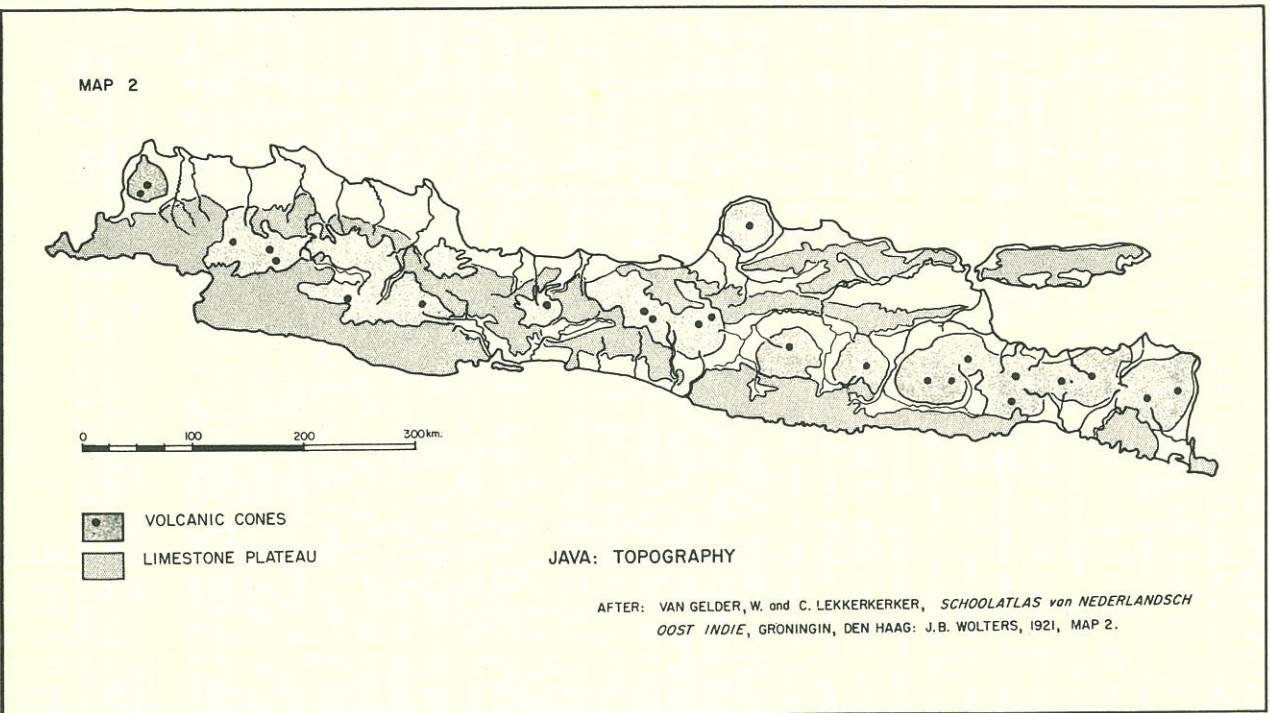
³ The best synthetic works on Indonesian geography are Dobby, 1954, and Robequain, 1954. For Java alone, Lekkerkerker, 1938, I, 13-90; and Veth, 1912, Vol. III.

ish rather than enrich the land around them, while Borneo, Celebes (except for its northern tip), and the Moluccas (except for western Halmahera) have no active volcanoes.

These climatological, topographical, and geological conditions do not necessarily preclude wet-rice agriculture from these regions, even with only traditional techniques. Its narrowly specialized ecological requirements can be met in a great diversity of settings and through a wide variety of means: the Tonkin Delta has no volcanoes, Malaya is as wet as Sumatra or Borneo, and northern Luzon is mountainous. But there is no doubt that in imposing a complex of adverse conditions for sawah to overcome, these geographical realities have played a great part in discouraging its establishment in the Outer Islands in favor of the more broadly applicable swidden; nor that the natural advantages of Java's small, volcano-rimmed river passages strongly encouraged its implantation there.

The first really effective integral wet-rice regimes seem to have been set up in a number of such passages in the central and eastern parts of the island. Perhaps the earliest of them appeared in and around the majestic volcanic quadrangle formed by Mounts Sumbing, Sindoro, Merbabu, and Merapi in the narrowed middle neck of the island; that is, along the southward-running Progo river in what is today the Magelang area, the upper Solo (Dengkeng) river southwest of Surakarta, the Serayu valley above present-day Banjumas, and the Lukolo and Bagawanta piedmonts around Kebumen and Purwardja (Kedu)—a region which after the eighth century blossomed into the so-called Mataram empire. Somewhat later, evidently, developed sawah appeared along the upper and middle Brantas river around Malang and Kediri, and, less extensively, in the Ponorogo area south of Madiun and the Lumajang area east of Malang—a region which flourished, as did south Bali with which it had important connections, after the tenth century. (See Map 3.)⁴ Further archeological work may

⁴ The best, and virtually the only, systematic attempt to relate the admittedly nonagricultural, archeological remains of the Hindu period to



render parts of this picture inaccurate in detail; but the general pattern is clear. The earliest manifestations of developed wet-rice agriculture almost certainly occurred either in the enclosed inner reaches of the somewhat larger northward-flowing rivers or in the upper basins of the generally shorter southward ones.

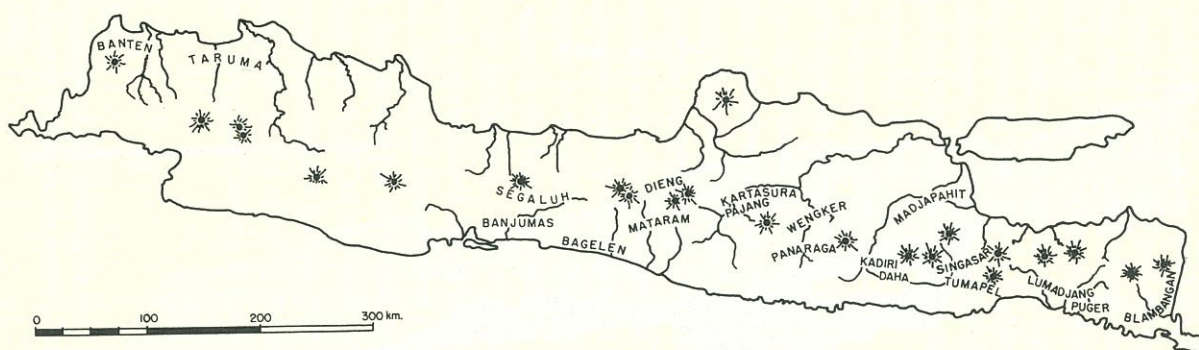
The expansion of sawah cultivation beyond the boundaries of these especially favorable regions (which are sometimes collectively referred to as Kcdjawén, or "Java Proper") in precolonial times, and in fact up to the middle of the past century, was gradual, tentative, fluctuating, and only partial.

Essentially, such extension could take place in three directions (see Map 4): northward toward the deltaic Java Sea coast (the south coast is about 80 percent calcareous), westward toward the Sunda highlands, and eastward toward the drier regions of the so-called "East Hook" (Pasuruan, Probolinggo, Besuki, and Banjuwangi). Each of these areas posed different technical problems in irrigation, all of them difficult to solve with traditional methods. In the littoral, which the Javanese call the *pasisir* ("strand," "coastline"), the problem was mainly one of perfecting water control, that is, improving flood protection and drainage, because of the great size of the river discharges (several times those of comparable temperate latitude rivers) and their extraordinary month-to-month, sometimes even day-to-day, variability.⁵ Fertil-

the Javanese landscape in order to draw some socioeconomic conclusions is Schrieke, 1957, pp. 102-104, 288-301. Some interesting speculations about Javanese agricultural history, based on distributional evidence can be found in Terra, 1958. For a general review of Indonesian post-neolithic archeology, see Bernet Kemper, 1959.

⁵The Tjimanuk at Indramaju has a normal highest discharge rate of 25,000 cubic feet per second, a normal low of 600, with occasional floods of 34,000; the Pemali at Brebes runs between 25,000 and 250, with crests at 34,000; the Solo ranges between 70,000 and 810, with 90,000 floods (!). On the general problem of the enormous river fluctuations in Java in terms of its implications for irrigation, see van der Meulen, 1949-50. Also, Dobby, 1954, pp. 47-60, 225.

MAP 3



JAVA: CLASSICAL KINGDOMS

AFTER: SCHRIEKE, B., *INDONESIAN SOCIOLOGICAL STUDIES*, PART TWO, "RULER and REALM in EARLY JAVA," THE HAGUE and BANDUNG: van HOEVE, 1957.

NOTE: THE KINGDOMS SHOWN ARE NOT CONTEMPORANEOUS, SOME OF THEM ACTUALLY BEING SUCCESSORS OF OTHERS, AND THEIR PLACEMENT IS GENERAL RATHER THAN PRECISE. FURTHER, ONLY A FEW OF THE MORE IMPORTANT KINGDOMS ARE INDICATED. SCHRIEKE'S MAP, ITSELF SIMPLIFIED, SHOWS ABOUT 50.

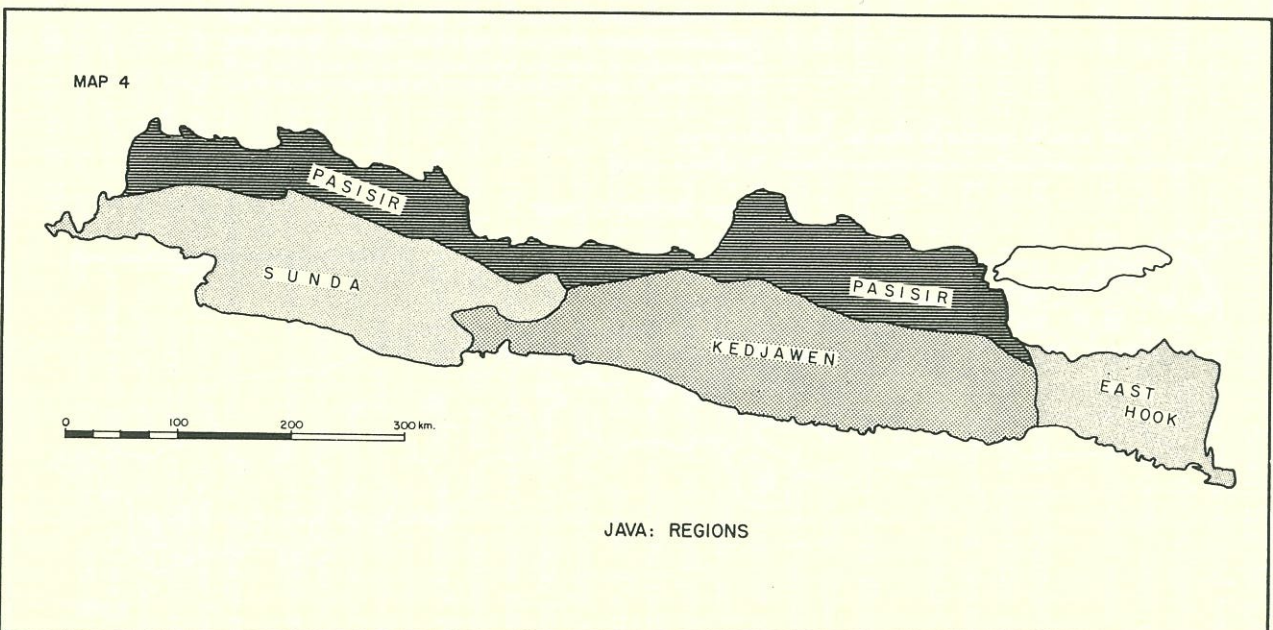
ity, particularly in the plain between Tjirebon and Djapara and in the Solo and Brantas deltas, was high, because of heavy alluvial deposits of volcanic and other sediment, and water was all too plentiful; but the great susceptibility to swamping because of near sea-level relief and the uncontrollable river spates made it a treacherous landscape for sawah during the classical period and well into the colonial. The Sunda highlands had sufficient water and good drainage, but also lower fertility because of increased leaching and less felicitous topographical arrangements. And the east was pressed for water.

As Mohr has noted, there are three independent aspects or functions of irrigation which are often insufficiently distinguished: the provision of moisture to otherwise arid soils—the “watering” function; the regulation of a quantitatively sufficient but uncertain and refractory water supply so as to avoid flooding—the “control” function; and the enrichment of the field through the transportation of nutrients to it—the “fertilization” function.⁶ Which aspect is critical depends upon which factor in the environment is limiting with respect to the regime concerned.⁷ Thus, where the availability of water is the limiting element, as in the East Hook, the first aspect is problematic. Where rainfall or river volume are irregular and unpredictable and drainage is difficult, as along the north coast, the second aspect looms as central. And where plant food is in short supply, as in Sunda, the third aspect is cardinal.⁸ In spreading out from its enclosed-plain nurseries in the Kedjawén, wet-rice agriculture had not just a single, uniform problem to solve, but, even in the broadest terms, three technically diverse ones. That it proceeded slowly is understandable.

⁶ Mohr, 1946.

⁷ On the concept of the limiting factor, “the factor that first stops the growth and spread of [an organic system],” see Clarke, 1954, p. 20.

⁸ Mohr, 1946.



Westward, in Sunda, it never got particularly far. The first reports of sawah penetration into the highlands come as late as 1750 from the Sumedang and Tasikmalaya areas, small piedmont river valleys near the eastern edge of the highlands, and a half-century later from the somewhat larger and higher plateau basins of Bandung and Bogor to the west.⁹ But even today intensive sawah cultivation is limited to these areas plus a few other favored pockets (Tjandjur, Sukabumi, the Garut plateau, and others). Eastward, in the Hook, penetration began earlier, around 1200. But as river water was in short supply the sawahs were dependent upon what rainfall could be trapped within their dikes and so remained limited in extent, reliability, and productivity until Dutch plantation interests led to the construction of modern reservoirs around the beginning of this century.¹⁰ Even then, though its productivity has improved, the scope of wet-rice cultivation has not grown especially great, occupying, as in Sunda, around 15 percent of the total land area, as against about 25 percent in the Kedjawén and 35 percent along the Pasisir.¹¹

The situation in the Pasisir, the north coast, is more complicated but the result is about the same. Some wet-rice farming has, in all probability, been carried on there at various points, particularly around the hundreds of minute estuaries which perforate the otherwise unvaried shore, since the earliest days. Some authorities

⁹ Terra, 1958.

¹⁰ Terra, 1958, and van der Meulen, 1949-50.

¹¹ These figures calculated from *Lanbouwatlas van Java en Madoera*, 1926, I, pp. 1*-55*, Sunda being considered to consist of Banten, Bogor, and Priangan; Pasisir of Diakarta, Tjirebon, Pekalongan, Semarang, Diapara-Rembang, Bodjonegoro, and Surabaya; Kedjawén of Banjumas, Kedu, Jogja, Solo, Madiun, and Kediri; and the East Hook of Malang and Besuki. These are 1920 figures, but although the total cultivated area has probably grown since that time, the inter-regional proportions have not radically changed. The comparable figure for south Bali (Tabanan, Badung, Gianjar, Bangli, and Klungkung) is 26 percent; see Raka, 1955, p. 28.

have even speculated that the first footholds of sawah cultivation on the island were secured in these small river mouths between the larger, unmanageable deltas.¹² Yet, in a more general sense, the coast always seems to have been a chancy and difficult environment for traditional sawah; it could exist there, but not thrive.

Because of the severe water-control problems (and perhaps for other reasons as well—the malarial unhealthfulness of the region, its vulnerability to military attack), the north never became the center of a developed agrarian culture comparable to that of the interior. After the inland civilization flourished, it moved hesitantly toward the coast, drawn evidently by the attractions of a burgeoning Java Sea trade economy; but it never really arrived. Though the inland civilization periodically controlled the harbor towns, it was never able to secure that control by establishing the sort of developed wet-rice economy which supported its power in the interior. In the few places where some success was achieved—as at Demak and, perhaps, at Tjirebon—it was partial, aberrant, and short-lived, a mere interlude of limited agricultural development based on, if not shifting sands, then surging waters, and the overwhelming supremacy of the interior in agrarian matters soon reasserted itself. When the Dutch arrived in the seventeenth century, more than three hundred years after this wistful drift toward the coast began, and when the major ports, now Islamic and only partly Javanese, were in full commercial swing, the area in general was nonetheless sparsely settled, and the agricultural center of gravity was still well inland, in the regions of the old Mataram.¹³ “The aforesaid [sultan of] Mataram has his residence about five or six days journey from Diapara, in the interior,” wrote Jan Pieterszoon Coen, Holland’s East India empire builder, “where there are diverse large, populous towns, and

¹² Terra, 1958.

¹³ Schrieke, 1955, p. 265.

the land is excellently abundant in rice and other victuals; all the rice that is carried along the whole coast of Java to Molucca, Johore, Ambon and Banda is usually loaded from here."¹⁴

¹⁴ Schrieke, 1955, p. 267. The Mataram here is of course the Islamic one of the seventeenth century, not the Hindu one of the eighth; but the region in which it was situated is more or less the same.

4. THE COLONIAL PERIOD: FOUNDATIONS

The Company

At the inception of the colonial period, then, the over-all ecological pattern was fairly well set: on Java, a wet-rice agrarian heartland shading off into less developed regions to the west, east, and north; in the Outer Islands, an immense tropical forest worked only here and there by small tribes of swidden farmers. The first object of interest of the Dutch, as of the Portuguese who immediately preceded them, were the Moluccas, the fabled spice islands; but their attention soon turned toward Java, and it is upon it that they mainly superimposed their colonial economy, turning back again to the Outer Islands only toward the end of the past century.

"Superimposed" is the proper word, because what the Dutch were essentially concerned to do, from 1619 to 1942, was to pry agricultural products out of the archipelago, and particularly out of Java, which were saleable on world markets without changing fundamentally the structure of the indigenous economy. The Netherlands was never able, particularly after William I's attempt to re-absorb Belgium failed, to develop a manufacture export