11. G. Kukusan (1,884 m) with Telagawaru crater.
12. G. Gelaman (1,762 m) with Kawaliwurung crater.
13. G. Gendingwaluh (1,519 m).
14. Outer crater wall of G. Genteng (Tambak-tambak 1,594 m).
15. Lava flows of G.Gentengd,712 m), G.Anjar(l,718 m) and G. Lingker (1,630 m).
16. G. Tjilik (1,672 m).
17. G. Pendil (1,770 m).
18. G. Melaten (1,552 m) and G. Tjemara (1,776 m).

Active volcanoes

19. Idjen volcano (2,386 m, lake [evel ± 2,148 m).
20. Raung volcano (3,332 m, crater floor 2,757 m).

Miscellanea

21. Basin of Blawan in the northern part of the Idjen caldera (formerly a ponded lake with its level at ca 1,080 m).
22. Crater rims; 23. Caldera rim; 24. Volcanic rent of Padjungan slide on the western slope of the Raung volcano (see NEUMANN V. PADANG in "De Ing. in Ned. Indie", Vol. 6, Section IV, pp. 35-41, 1939).
23. Hot springs (alkaline) with sinter-formation.
24. Observation post and tunnel of Volcanological Survey.

The **Lamongan complex** is a much smaller and apparently younger structure than the Tjang Complex to the East and the Tengger Complex to the West. The central Lamongan cone (1,671 m) is very active and surrounded by parasitic epigones in an oblong area with an E-W axis of 37 km and a N-S axis of 18 km (NEUMANN VAN PADANG, 1939; see fig. 67 on pl. **5**). The Lamongan and its epigones are situated on a depressed section of the anticlinal axis of Java (see fig. 260).

Of volcanic-tectonical interest are the phenomena in the years 1925-1926, when a system of ENE-WSW and E-W trending fissures opened in a 4 km long zone between Klakah and the summit of the Lamongan, accompanied by local earthquakes and rumblings.

These events have not caused a mountain slide as was the case with the Raung where probably similar fissures were formed in the flank of the high and steep cone (see above). These Lamongan fissures demonstrate the presence of tensional N-S stresses in the crest of the Java geanticline.

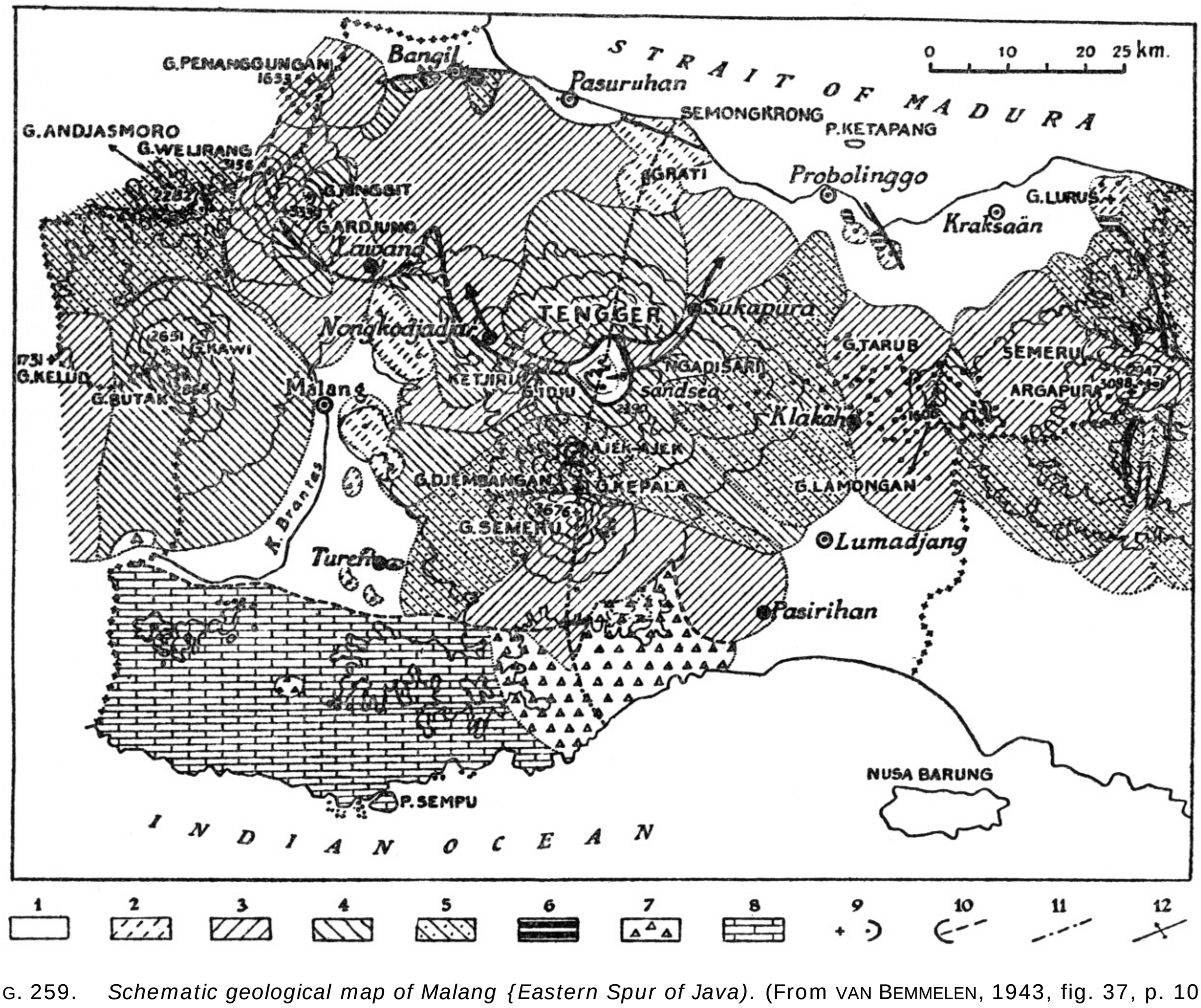

FIG. 259. *Schematic geological map of Malang {Eastern Spur of Java).* (From VAN BEMMELEN, 1943, fig. 37, p. 102)

1. Alluvial deposits.
2. Small eruption centres of subrccent to recent age.
3. Active volcanic cones and eruption products of the crescentic Tengger fissure.
4. Subrecent volcanic cones.
5. Upper-pleistocene volcanic complexes, which partly continued their activity up to subrecent time.
6. Marine Plio-Pleistocene.
7. Miocene volcanic products.
8. Miocene limestones.
9. Centres of eruption.
10. Faults and fissures.
11. Transverse faultzone upon which the eruption centres of the Tengger-Semeru group are situated.
12. Anticlinal axes.

The **Tengger-Semeru complex** consists also of some older (? upper-pleistocene) volcanic structures and younger (holocene) cones (fig. 259, 260, 261).

The following succession can be derived from the morphological features: The Djembangan is the oldest part; then followed the older and the younger Tengger volcanoes and, finally, the active Semeru (3,676 m, highest summit of Java).

The eruption centres are not grouped on the E-W axis of the Java geanticline, but along a N-S line, slightly concave to the East. On this line are also situated the young eruption centres of the Grati-Maar and the Semongkrong (? tuff-cone) on the North coast. This N-S line probably represents a transverse fault or flexure across the Java geanticline, and forms the western boundary of the depressed Lamongan section (see fig. 259 and 260). It is the reversed image of the rift through the Ijang Complex, at a distance of about 70 km farther East, on the eastern side of the Lamongan depression. The subsidence of the intervening ge-anticlinal portion is also manifested by the absence of the Southern Mts in this section.

Such depressions bordered by transverse faults in the geanticlinal structure of the volcanic inner arc are also responsible for the interruptions in the eastward extension of the Java geanticline in the Lesser Sunda Islands; for instance, the formation of Strait Bali, and the other straits separating these islands, schematically figured in the longitudinal section of fig. 211 on pl. **24**.

Besides this transverse fault or flexure in the basement complex dominating the Tengger group as a whole, the Tengger cone proper shows another typical volcano-tectonic feature. As was shown by the author (1937 e), the old Tengger volcano has been torn asunder along a large crescentic fissure, 47 km long and concave to the North. Along this rift the northern portion of the cone subsided and slid northward. This rupture in the roof of the underground magma-chamber caused the outflow of huge amounts of basaltic lava, which spread delta-like into the foreland at both ends of the rift. This cataclysm probably caused the engulfment of the upper part of the cone, so that the Sandsea caldera was formed. The collapse of the Tengger was the result of the enormous weight of volcanic material, amassed on the more or less plastic basement of tertiary marine sediments. The northern part of the Tengger volcano slid northward, toward the subsiding Strait Madura geosyncline. The updoming of the Semongkrong might be the complementary effect of compression at the North foot of the Tengger.

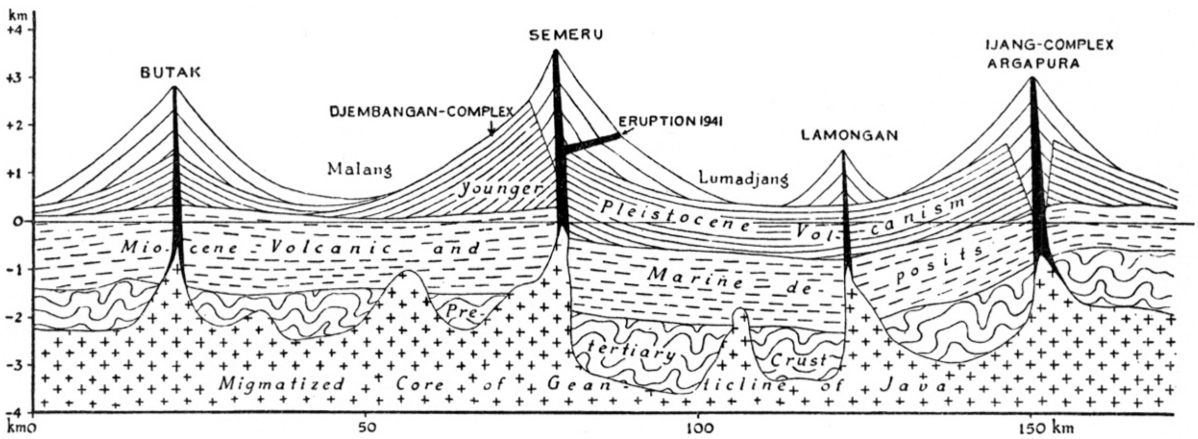

FIG. 260. *Longitudinal section of the Java geanticline in the eastern spur of the island.*
(From VAN BEMMELEN, 1943, fig. 39, p. 102)