

Thus from Halmahera to New Britain there are numerous relics of a crystalline foreland heavily injected with peridotite and serpentine—probably towards the end of the Cretaceous—which served as the buttress against which the Neocene formations to the south were folded and overthrust in the late Tertiary. That this foreland was formerly more extensive is indicated by the presence of pebbles containing Jurassic fossils in the basal Miocene conglomerate, and by the interesting observation that the pebbles diminish in size as they are traced southwards from the coastal region.

A broad belt of Neocene beds has been traversed as far south as the Idenberg River. For the most part this terrane consists of low undulating hills with slow-flowing rivers. There are Miocene andesites and basalts, as in Papua and most of the circum-Pacific lands. But although the landscape is quiet and in a far advanced stage of erosion, the rocks have been strongly compressed and overfolded to the north. Fortunately the low relief is conspicuously interrupted, half-way between the swampy plains of the Idenberg valley and the coast, by a series of ridges having a north-west trend that becomes westerly in the west. These are the Karamoor and Van Rees Mountains, and they constitute a resistant anticlinal core with windows through the Neocene conglomerates revealing the crystalline schists beneath. Folded Miocene beds are known both north and south of McCluer Gulf, while the anticline exposing the older rocks appears to be continued to the west through Misool, Obi, and the Sula and Peling Islands. The observations of Zwierzycki east of Geelvinck Bay thus give a meaning to this east-west line of islands, and make it no longer necessary to assume, as some geologists have done, that the Central Range of New Guinea is continued through the Arfak Mountains or through Misool.

The great Central Range stretches from the south-east of the island through the Owen Stanley Range of Papua to the Charles Louis Mountains of Dutch New Guinea. In the British territory, it has a core of Archæan rocks and is flanked to the north and south by Palæozoic formations.² The existence of a similar core in the Dutch part of the Range is known only from pebbles brought down by the rivers, for the mountains themselves have not yet been explored. Nevertheless, it is now clear that the core continues to the west through Ceram and Buru, both of which are Archæan terranes composed mainly of schists.

South of the Owen Stanley Range there is another belt of Tertiary sediments and volcanic rocks. E. R. Stanley states that the trend lines can be traced into Dutch New Guinea, and thence into Ceram, Celebes, and Southern Borneo. Structural and palæontological work in the oil-fields probably justifies this conclusion, but I am aware of no published evidence that helps one to trace any of the trend lines here elucidated into the little-known complex of Celebes. Stanley suggests that the Central Range has an Indo-Malayan structure, and the association of tin with some of the granites, especially in the east, makes this a tempting speculation. Zwierzycki, on the other hand, correlates the Central Range with the Himalayas, and suggests that the depression of South New Guinea is similar to the Indo-Gangetic Plain. It is, however, equally probable that it corresponds to the depression that runs from the Irrawadi valley to the Straits of Malacca. Until the direction of overthrusting or overfolding, if any, is determined in the southern Tertiary belt of New Guinea, and until the puzzling structures of Celebes and Borneo are linked up with those of the neighbouring islands, it will not be possible to deduce the position of New Guinea in the Alpine-Himalayan system.

ARTHUR HOLMES.

² E. R. Stanley, "The Geology of Papua," 1924, p. 51.

Obituary.

MANY readers of NATURE will learn with regret of the death of Mr. Joseph Goold, of Nottingham, who passed away in his sleep in the early morning of November 15 at the age of ninety years. He had retained all his faculties until the end. Mr. Goold was well known to many through his invention of a novel method of causing steel bars and plates to vibrate. His method was to fix a short length of cane in a suitable handle, and having arranged the cane to vibrate at a particular frequency, he gently stroked the plate or bar with the end of the cane. The friction set the cane into a state of vibration, and its small motions were imposed upon the plate or bar, which was set into a very active state of similar vibration. Mr. Goold gave many demonstrations of his experiments at conversaciones of the Royal Society, and at meetings of the British Association. He used to relate that this method of vibration suggested itself to him while he was thinking of the difference between the sound of a creaking door and that of a musical instrument. For many years Mr. Goold had worked at new ideas in connexion with the musical scale. A paper on this subject by Mr. Goold was communicated

to the Royal Society of Edinburgh and published in the *Proceedings*, vol. 40, part 2, No. 18, June 21, 1920. He says in this paper: "The scale is primarily a system of intervals rather than a series of notes; for though its divisions are marked by notes (just as the divisions of a ruler are marked by lines) the divisions themselves are not notes but intervals." Since then Mr. Goold has extended this investigation, and was working at it practically until the time of his death.

WE regret to announce the following deaths:

Mr. Carl Akeley, author of "In Brightest Africa" (1924), who was collecting for the American Museum of Natural History in Central Africa, on November 29, aged sixty-two years.

Prof. Ettore Molinari, of Milan, one of the best known of Italian technologists, and the author of "Trattato di Chimica generale ed applicata all'Industria" which has been translated into several languages, died on November 9, aged fifty-nine years.

Prof. R. W. Phillips, formerly professor of botany at University College of North Wales, Bangor, on December 2, aged seventy-two years.