

**GOVERNMENT-GENERAL OF MADAGASCAR AND DEPENDENCIES**

GEOLOGIC RECONNAISSANCE MAP

200,000 scale



**EXPLANATORY NOTE**

ON THE

**MAHABO SHEET**

FG. 50-51 (504)\*

by

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ANTANANARIVO

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## INTRODUCTION.

The position of the sheet is indicated on the paperboard image of the cover of the note. It belongs to the Morondava region, includes a large part of the Mahabo district, encroaches slightly to the west on that of Morondava and, to the north, on the subdivision of Belo-sur-Tsiribihina.

**Geographic outline.** — One can separate, from the geographic point of view:

1st. The Ankirijy plain, which occupies the southeast corner of the sheet, and corresponds to the Upper Jurassic outcrop. A less wooded country, often sandy, with rare and slightly elevated hills, it is a cattle-rearing area, populated by Sakalava and Bare farmers;

2nd. The sandstone zone, whose northeast is marked by a cliff diminishing in clarity toward the south. Its northern part is formed by elevated, sandy plateaus slowly dropping toward the west, notched with deep, sometimes wooded valleys. Toward the south, at the same time that its width is reduced and the cliff drops, its relief is attenuated and is hardly indicated more than by some hills: Ambohitelo, Tsidemodemoka. It is deserted outwards of rare villages and herders;

3rd. The plateau of Eocene limestone and Pliocene sands. Dominating directly the sandstones by a slight projection, some low plateaus begin, above all developed to the north, covered by a sparse forest to the east, dense to the west, and which extends up to near the coast, where their monotony is interrupted by several valleys. The population, much less dense, is localized in the clearings to the east, favorable to breeding, and in the littoral zone;

4th. The alluvial plain of Mahabo-Morondava. Low, very wooded, rich in terrains favorable for the culture of rice and Cape peas; this is an important population center. All the races are represented here: Hova traders, Betsileo, Tanandro, Antaimoro cultivators. The Sakalava are rare, collected in distinct villages, and in the process of disappearing. Mahabo, an important commercial and agricultural center, is connected to Morondava by an automobile route, and will be soon equally equipped with a railroad recently under construction.

## STRATIGRAPHY.

The superabundance of Pliocene or Recent coverings renders observations difficult. It is generally by continuity that the series observed were dated.

**Middle and Upper Jurassic.** — It outcrops in the Ankirijy plain, very often masked by a carapace sometimes full of clayey sands.

From bottom to top, one observes there clear-colored sands, with cross-bedded stratification, without fossils, forming probably the top of the Bathonian, then sometimes coarse sandstones, with numerous fragments of lamellibranchs, which I consider as Callovian.

Following comes a marly series, with rare intercalations of sometimes glauconitic or calcareous sandstones. This is the series of yellow Ankilizato Marls (Ankilizato sheet). Two localities of fossils there are particularly interesting.

a. West of Ankirijy. In the marly ferruginous limestones, I have recovered: *Epimayaites* sp., *Phylloceras* spp., *Perisphinctes* sp., *Trimarginites* sp., *Euaspidoceras* sp., lamellibranchs, brachiopods and echinoids. These fossils, although of rather mediocre preservation, permit indicating a lower Argovian age (Lower Dhosa colite of India) for the beds that contain them;

b. Andrangory. There are two very close levels there, the lower one formed by alternating limestones and marls, and the superior one of marls with nodules. The latter, more important one has furnished: *Ptychophylloceras ptychoicum*, *Taramalliceras* sp., *Epimayaites* aff. *transiens* WAAG., *Dhosaites* nov. sp., *Paryphoceras* nov. sp., *Pachyplanulites subevolutus* WAAG., *Dichotomosphinctes subrota* CHOFFAT, *Perisphinctes* cf. *indogermanus* WAAG., *Peltoceratoides arduennense* D'ORB., *Euaspidoceras* sp. We are thus in the presence of the upper part of the *P. transversarium* zone, thus the top of the Argovian. This is the equivalent of the Upper Dhosa colite, or the Kantcote Sandstones (N. W. Kach), and this zone is characterized by *Proscaphites anar* in Madagascar.

The presence immediately to the east of lagunal beds with *Corbula lyrata* SOW and *Pseudocardium grandidieri* NEWTON (upper Bathonian), the impossibility of determining the existence of faults prolonging south of those of Ankilizato, and the rarity of fossils renders the stratigraphy of this ensemble difficult. The age of its summit is equally doubtful, but it does not seem to reach the lower Kimmeridgian, a generally regressive period.

**Upper Albian to upper Turonian.** — The top of the yellow marls is directly covered by a thick sandy red series, poor in fossils, that continues to the south as the sandy-clayey Antsalova complex. To the north, with a thickness of more than 200 meters, this series goes from the upper Albian to the top of the Turonian. Toward the south, its thickness decreases rapidly, and only its lower part seems to persist.

**Maastrichtian.** — It outcrops, to the north of the sheet, on a weak surface. Its facies, littoral, is represented by clear yellow marls and white marly limestones containing *Alectryonia ungulata* SCHLOTH. and *Pycnodonta vesicularis* LAMARCK in abundance, but not cephalopods. It is absolutely identical to that known in the Belo region. Its thickness is around 50 meters, and it is rapidly covered toward the south by sometimes compact, friable limestones that I attribute to the Eocene.

**Eocene.** — Some compact limestones, very eroded, appear here and there under the Recent sands of the coast. The outcrops, sporadic to the north, become more continuous to the south, where, on the ancient *piste* going from Ankilizato to Mahabo in the environs of Dabara, they show an alternation between yellow and yellow-green marls, and compact limestones over a thickness of about a dozen meters. This is where H. Douvillé noted lamellibranchs (*Ostra* gr. *d'edulis*), sea urchins (*Echinanthus*) and foraminiferans (*Alveolina* sp. and *Orthophragmina* sp.), permitting the dating of these beds to the lower Eocene.

**Miocene.** — A single, very localized outcrop formed of yellow marls with rare limestone intercalations, situated on the right bank of the Maharivo River, near the village of Ampanihy, containing *Echinocyamus* cf. *voeltzkowi* TORNQ., is referred to the Miocene.

**Pliocene.** — The sandstones and red sands generally considered as Pliocene cover a great part of the sheet. They are always poor in fossils and correspond to a continental episode.

**Quaternary.** — After the Pliocene emersion, a considerable filling permitted the deposition of enormous quantities of alluvium, to which are connected white sands probably coming from the scrubbing of red sands. Several levels exist in these alluvia, but the cartographic difficulties rendered their delimitation impossible.

A clayey-sandy carapace, of eluvial and alluvial origin at the time, largely covers the Jurassic and Cretaceous.

## INTRUSIONS AND CASTINGS.

The southern part of the Antsoa castings is still visible to the north of the sheet. There it includes basalts with large crystals of bytownite (A. LACROIX, *Minéralogie de Madagascar*).

The intrusions are extremely numerous, above all in the northern region. They include only basic rocks: basalts and labradorites. Some seams with diabasic facies are visible in the Upper Jurassic to the southeast.

These intrusions caused neither metamorphism nor accidents.

## TECTONICS.

Few things are noted in this point of view.

The Middle Cretaceous and Eocene transgressions are highlighted by the disappearance of the Upper and Lower Cretaceous.

Although some faults exist probably in the Jurassic, they could not be noted. The series is calm, monoclinical, with very weak dips to the west.

## GEOLOGIC HISTORY.

The continental deposits of the Bathonian are followed by a transgression during which the sea reached its maximum depth at the top of the Argovian. Consequently, a clear regression was effected, highlighted by the presence of lignite beds at the top of the "sandstones and yellow marls."

It is in the Albian that an important transgression will bring the red sandstones until the Jurassic, rapidly with a new retreat.

The sediments remain marine after the Turonian, but will be masked by the considerable advance of the sea in the lower Eocene.

The Pliocene sands and sandstones are the indication of an important rise, following an erosion, and finally of a wide filling to the recent Quaternary.

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