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*Why the term Habana formation should no longer be used*

Before summarizing the lithologic features of the formations of the Habana and Marianao groups a brief historic review is indicated to explain our decision to drop the term Habana formation as employed by R. H. PALMER and others. The name Havana or Habana was first introduced as a lithologic term by L. RUTTEN (1922) who proposed the "Older Habana formation" for Cretaceous deposits which he however placed in the Eocene, Oligocene and possibly "older Miocene" (PALMER, 1934, p. 128; L. RUTTEN, 1940, footnote on p. 545), and then by WHITNEY LEWIS (1932, p. 539) whose Cretaceous Havana shales refer to a vague lithologic unit below his Madruga chalk and above older Cretaceous rocks.

PALMER (1934, pp. 128–132, table I on p. 125) used the name Habana in a different sense from that originally given by RUTTEN. He defined the Habana formation as follows: "In the western half of the area under discussion (Habana area) the lower measures of the Habana formation are a thick series of light gray and brown, limy shales and marls. Wells within this terrain indicate that the unweathered shales are blue in color and contain much pyrite and organic material. Thus far they are known to contain but few fossils. These shales lie directly under a thick series of interbedded sandstones and shales that in private reports have been termed 'El Cano shales' from their occurrence near the town of that name. In the El Cano member thus far few fossils have been found. (El Cano was apparently first used by WHITNEY LEWIS (1932, p. 539) in his El Cano formation.)

From about the middle of the area and extending eastward to Matanzas the lower shales and the overlying hard sandstone change lithologically, assuming a more marine aspect, and break up into four fairly well recognized members. The lowest of these is a loosely consolidated gravel which is followed successively by a calcareous sandstone, a chalk, and is capped by a deposit that alternates between a limestone and a calcareous shale."

The following diagram attempts to show graphically PALMER's concept of the Habana formation of 1934. In this interpretation we have incorporated data from this author's stratigraphic chart (1934, p. 125), geological map (1934, fig. 1) and lithologic descriptions of the individual members of the eastern development of the Habana formation.

| | | | Habana area | | |
|---|---|---|---|---|---|
| | | | Western part | Middle part | Eastern part |
| Late Upper Cretaceous | Habana formation | Upper | Sandstones and shales (El Cano shales–El Cano member) | Brown shales ("Dirty shales") | Big Boulder Bed member |
| | | Lower | Light gray and brown limy shales and marls | Chalk member (Jacomino)<br>Cone sandstone member<br>Lime gravel member | |

Evidently, Palmer recognized at least two groups of lithologies in his Habana formation: a western group characterized by shales, sandstones and marls and a

group in the middle to eastern part of the Habana area with predominantly clastic calcareous sediments. The brown shales occasionally referred to by PALMER as "Dirty shale" member of the Habana formation, were regarded as an intermediate facies between the western "El Cano" and the eastern "Big Boulder Bed" lithologies. The diagram explains further that the Habana formation is lithologically heterogeneous. It shows correlations between sediments of different environments and from different areas, which at the time they were proposed could not be supported by fossil evidence (PALMER, 1934, p. 131). In 1945, PALMER (p. 12) changed his idea of the Habana formation and recognized in its eastern development only 3 members by dropping the Chalk member. In this paper he did not mention any longer the "Dirty shale" equivalent of the Big Boulder Bed member.

Where subsequently the name Habana formation was mentioned, it never meant a well-defined formation with definite lithologic features but rocks of late Upper Cretaceous, mainly Maastrichtian age. PALMER (1942, p. 629) used Habana formation in exactly this age sense when he wrote: "The Maastrichtian in Cuba has been named the Habana formation from its well developed occurrences in Habana Province." He actually identifies the Maastrichtian stage with the Habana formation. The Habana formation therefore was regarded by PALMER, and later by some of the Dutch geologists as a time concept and not as a lithologic unit. THIADENS (1937) called Habana formation the shallow-water orbitoidal and rudistid limestones of Maastrichtian age of the Cienfuegos area, and VERMUNT (1937) applied the term Habana formation to the flysch-type deep-water sediments of Maastrichtian age of Pinar del Río Province.

Because the Habana formation is 1) a complex lithologic unit of wide stratigraphic and lithologic spread and 2) has been generally employed in a local stage sense, it is recommended to suppress it and to establish in its place 3 new lithologic units, viz. the pre-Vía Blanca beds of Cenomanian (?) to Turonian age, the Vía Blanca formation of Campanian to Lower Maastrichtian age, and the Peñalver formation of Upper Maastrichtian age. The name Habana, however, will still be used in the designation Habana group of formations. In our stratigraphic concept PALMER's El Cano shales are part of the Lower Eocene Capdevila formation.

## *Stratigraphic Summary*

### *Habana group*

As shown by the detail lithologic and environmental descriptions of its formations, the Habana group represents a flysch series (TERCIER, 1947; SUJKOWSKY, 1957) characterized by sedimentary features such as listed below:

1. Rapid alternation of sharply defined marine pelitic and psammitic layers. Psammitic layers are usually graded bedded, the coarser grains being at the bottom and the finer grains at the top of the bed.
2. Thick series of monotonous aspect.
3. Occasional intercalations of thin limestones and of conglomerates.
4. Penecontemporaneous folds and faults and erosional features caused by submarine slumping and turbidity currents reflecting unstable tectonic conditions in the source area.