Cast near base of barb of Guinea fowl. × 400

ined. Where the surface cells appeared to be thicker, additional weights were added to give a load of approximately 10 lb.

The first casts made were of barbs without barbules; but later it was found that the presence of barbules made very little difference to the casts. Barbs from the feathers of Guinea fowl, 'Silky' fowl and *Chlorophanes spiza* (Cœrebidæ) were examined in this way. The patterns formed by all these show a network of polygons arranged with their long axes parallel to the length of the barb. Thus the surface cells are of a different shape from those within the cortex, which are long and similar in shape to the cortical cells in mammalian hair.

In some instances, for example, the reverse side of the barb of the Guinea fowl, the following details can be seen in the cast: (1) an oval area corresponding to the original position of the nucleus in each cell; (2) coarse striations; and (3) fibrillary structures. The close moulding of the thin 'surface cells' to the cortex proper may be the reason why the coarse fibrillary striations, arranged in parallel in the cortex proper, are visible in the cast. The patterns formed by the fibrillary structures within the surface cells are not always clearly visible in the casts of all feather barbs; but in the cast of the reverse surface of the barb of Guinea fowl the pattern formed by these structures can be seen superimposed upon that formed by the parallel fibrillary striations of the cortex proper. This pattern gives the effect of a delicate cross-hatching with a distinctly longitudinal trend within the network formed by the boundaries of the surface cells (see photograph).

Further evidence of cell boundaries is seen in transverse sections of the feather barb of the Guinea fowl. Indentations can be seen in the surface margin of the reverse side of the barb when thin (one micron) unstained sections are viewed by phase-contrast using 1/12 in. oil-immersion objective.

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Sedimentation in the Tropical Indian Ocean

As a result of recent investigations[1] into the distribution of the Radiolaria in the sediments collected by the Swedish Deep-Sea Expedition in the Western Pacific Ocean, two conclusions of outstanding importance can be drawn: first, that several species of Radiolaria which are widely distributed in the tropical oceans of the present day do not extend farther back in time than the very latest Tertiary or early Quaternary; secondly, that erosion and re-distribution of older sediments on the deep-sea floor often result in the mixing of the tests of Tertiary Radiolaria with Recent ones in that region.

With the object of determining whether either of these effects could be found in the sediment cores collected by the Expedition in the tropical Indian Ocean, a preliminary examination was made of the Radiolaria from samples taken at 1-metre intervals in the following cores:

Core No.	Position		Depth
	Lat.	Long.	
125	S. 10° 07′	E. 108° 56′	6,875 m.
127	S. 11° 07′	E. 103° 39′	5,650 m.
128	S. 11° 28′	E. 102° 24′	5,170 m.
137	N. 01° 56′	E. 88° 12′	4,300 m.
141	N. 02° 18′	E. 76° 02′	3,765 m.
142	N. 00° 35′	E. 75° 14′	4,050 m.
143	S. 00° 31′	E. 74° 33′	3,314 m.
145	S. 01° 20′	E. 68° 20′	3,620 m.
147	S. 01° 19′	E. 66° 16′	4,380 m.
149	S. 01° 22′	E. 62° 38′	4,750 m.
154	S. 00° 23′	E. 54° 30′	4,860 m.
155	N. 04° 28′	E. 52° 48′	5,117 m.

This examination showed that all the characteristic present-day tropical species occurred in all cores at all levels—even those species which are known to have short time-ranges do not disappear at the bottoms of the cores. No Tertiary Radiolaria were found in any of the samples examined.

From these results it can be concluded that, along the course of the Swedish Deep-Sea Expedition in the Indian Ocean, there is no locality where Tertiary sediments have been laid bare by bottom currents which have eroded them and re-distributed their components. This is in strong contrast to the results from the Western Pacific Ocean, where such effects of current erosion seem to be widespread.

The reason for this difference in the results from the two oceans probably lies in their different geological histories. The floor of the Indian Ocean has been a region of comparative tectonic quiet since the Eocene. Thus there have been no major changes in the topography of the sea-floor which would result in widespread re-distribution of sediments. The Western Pacific, on the other hand, was a region of considerable diastrophic activity at the close of the Tertiary, and therefore late Tertiary sediments in that area must often have been brought into the sphere of action of bottom currents.

Even though there is no evidence of recent erosion of Tertiary sediments in the tropical Indian Ocean, it is not impossible that Quaternary sediments are being moved, to a certain extent, by bottom currents. Nevertheless, the magnitude of this process must be much less than in the Western Pacific.

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[1] Riedel, W. R., *Medd. Ocean. Inst. Göteborg*, No. 19 (1951).